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ABSTRACT

This curriculum guide was developed to help teachers (especially in Louisiana) prepare students to obtain entry-level employment in data processing or a related career. The guide provides a rationale and course description for a two-part course to be taught in grades 11-12. The guide contains 11 units. Early units introduce students to fundamental data processing concepts, equipment operations and data entry, programming, software applications, computer systems, and data processing-related careers. Programming problems and software applications are business oriented. Additional units for a second-semester course include advanced data processing fundamentals, proficiency in data entry operations, advanced programming, and advanced software applications, as well as a unit on the impact of computers on society. Each complete unit of instruction contains competencies, objectives and goals, mastery criteria, methodology, content outline, activities, sample tests with answer keys, ideas for bulletin boards, and lists of equipment, supplies, and supplementary materials. (KC)

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COMPETENCY-BASED DATA PROCESSING

Office of Vocational Education

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STATE OF LOUISIANA

DEPARTMENT OF EDUCATION

BULLETIN NO. 1771
COMPETENCY-BASED DATA PROCESSING

Issued by

Office of Vocational Education

Elaine Webb, Ed.D.
Assistant Superintendent

THOMAS G. CLAUSEN, Ph.D.
State Superintendent

1986

FOREWORD

This curriculum guideline, *Competency-Based Data Processing*, was produced as a result of a project funded by the Louisiana State Department of Education to Nicholls State University, Thibodaux, Louisiana. These units were developed with the assistance of Business Education teachers in the State of Louisiana.

The instructional units of work included in this curriculum guide have been written to aid teachers in meeting the challenges of preparing students for employment in today's computerized society. This guide lists specific objectives that, when achieved, will enable the student to obtain entry-level employment in one of the many data processing and data processing-related careers available in our information service society.

Thomas G. Clausen

Thomas G. Clausen, Ph.D.

ACKNOWLEDGMENTS

This publication represents the cooperative efforts of personnel at Nicholls State University and the Business Education Section in the Office of Vocational Education, Louisiana State Department of Education. Special recognition goes to Dr. Debbie D. DuFrene who served as project director and Dr. Betty A. Kleen who served as workshop instructor in the development of the guide. Special commendation goes also to members of the writing team who worked diligently to make this publication a reality.

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COURSE DESCRIPTION

Data Processing I is a course designed to acquaint students with basic principles and terminologies associated with data "information" processing. The one-semester course includes units in fundamental data processing concepts, data entry, programming, software applications, computer systems, and data processing related careers.

Data Processing II is a course designed to provide job training for entry-level employment in the computer data processing field and related areas or to prepare students for advanced study in the area of computer data processing at a post-secondary level. The one-semester course includes units in data processing fundamentals, equipment operation, advanced programming, advanced software applications, and the impact of computers on society.

Suggested Grade Level: 11-12

Total Number of Weeks: Data Processing I 18 weeks
Data Processing II 18 weeks

Units of Credit: Data Processing I 1/2 unit
Data Processing II 1/2 unit

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RATIONALE

We are now in an information age, and each day more and more persons find themselves interacting with a computer or computer terminal in some aspect of their jobs. No aspect of today's society is untouched by computers and data processing, and the future for computer applications holds capacities for revolutionary changes in the way that work is done in any organization.

Proper use of computers and data processing technology can result in improved allocation and control of resources within an organization, often resulting in more timely information and higher profits. Rarely have computers and data processing technology been introduced into an organization with no accompanying change in the way work is done. Therefore, it has become necessary that business educators prepare students to take their places in this information service environment of our increasingly computerized society.

Units presented in the guidelines are designed to introduce students to fundamental data processing concepts, equipment operations and data entry, programming, software applications, and data processing-related careers. Programming problems and software applications are business oriented.

Additional units for a second semester course include advanced data processing fundamentals, proficiency in data entry operations, advanced programming, and advanced software applications, as well as a unit on the impact of computers on society.

While two semesters of data processing may not be offered in all schools, and some schools may not offer data processing on a separate basis, some of the topics and activities could be integrated into Office Procedures, Office Machines, Typing II, Accounting, or Cooperative Education Programs.

The materials in data processing would ideally be presented to students who have already completed Typing I.

Because of advancing technology, availability of more computers, and the current attention being given to making elementary students computer literate, new units of instruction may be added to the data processing courses in the future. In high schools in which entering students are already reasonably computer literate and have had some previous work with BASIC language, more advanced programming assignments could be added or more advanced software applications could be explored.

The guide does afford guidance and assistance to a teacher of data processing by providing complete units of instruction with competencies, objectives and goals, methodology, content outline, activities, sample tests, ideas for bulletin boards, and lists of equipment and supplies and supplementary materials.

SUGGESTED TIME SCHEDULE

		Weeks		
Data Processing I				
I.	FUNDAMENTAL DATA PROCESSING CONCEPTS	2		
II.	DATA ENTRY	3		
III.	PROGRAMMING	5		
IV.	SOFTWARE APPLICATIONS	3		
V.	COMPUTER SYSTEMS	3		
VI.	DATA PROCESSING RELATED CAREERS	2		
			18	
Data Processing II				
VII.	DATA PROCESSING FUNDAMENTALS	3		
VIII.	EQUIPMENT OPERATION	4		
IX.	ADVANCED PROGRAMMING	5		
X.	ADVANCED SOFTWARE APPLICATIONS	4		
XI.	THE IMPACT OF COMPUTERS ON SOCIETY	2		
			18	
				36

UNIT I

FUNDAMENTAL DATA PROCESSING CONCEPTS

INTRODUCTION

We are living in a technological decade of challenge and change. Whether or not individuals are consciously aware of it, their lives are being touched daily by computer technology. We must be knowledgeable of our surroundings in order to develop the necessary awareness and skills to survive in an ever-changing technological world. This unit will provide basic knowledge of data processing concepts in order to adjust comfortably to the far-reaching effects of computers in our homes and businesses. Successful completion of the unit will provide the learner with working knowledge of fundamental data processing concepts.

COMPETENCIES

1. Define data processing and other related terms.
2. Describe various data processing operations.
3. Examine the role of computers in business and in the home.

GENERAL PERFORMANCE OBJECTIVES/GOALS

1. Discuss data processing and its role in home and business applications.
2. Evaluate various home and business applications.
3. Examine data processing procedures.
4. Relate background information on the growth of data processing.

SPECIFIC PERFORMANCE OBJECTIVES AND MASTERY CRITERIA

1. On a written test, students will be able to define basic data processing terminology with at least 75 percent accuracy.
2. On a written test, students will be able to discuss with at least 75 percent accuracy the similarities between data processing and information processing.

3. On a written test, students will be able to describe with at least 75 percent accuracy the purpose of typical equipment used in data processing.

4. On a written test, students will be able to differentiate among the four types of data processing systems with at least 75 percent accuracy.

5. On a written test, students will be able to classify statements relating to the six data processing operations with at least 75 percent accuracy.

6. In class, students will be able to trace the development of data processing from previous centuries to the present time.

7. In class, students will be able to examine reasons for the difficulties in accepting changing technology.

8. In class, students will be able to examine costs in computerizing.

9. Students will be able to express at least two possible needs and uses of data processing technology in various business applications such as to transportation, crime control, education, community services, medicine, and government.

10. Students will be able to debate the advantages and disadvantages of data processing technology in business applications.

11. On a written test, students will be able to discuss at least five possible needs and uses of data processing technology in the home.

12. Students will be able to debate the advantages and disadvantages of data processing technology in the home.

13. Given selected information on a written test, students will be able to identify the appropriate phase of the data processing cycle under which the information would be categorized with at least 75 percent accuracy.

14. On a written test, students will be able to give three examples of how the computer has restructured business and the nature of jobs.

15. Students will be able to prepare a two-page report summarizing the applications that show the greatest use of business and/or home computing resources.

16. Given statements related to data processing fundamentals and terminology on a written test, students will be able to identify terms correctly or to indicate if a statement is true or false with at least 75 percent accuracy.

METHODOLOGY

This unit has been developed to acquaint students with fundamental data processing concepts. Through the incorporation of field trips, speakers, review of current literature, and other activities, students can begin to understand the impact data processing has on their lives. The instructor has many resources available through the library and complimentary copies available from publishers. Some of these resources are listed in the reference section of this unit.

SUGGESTED INTEREST APPROACHES

1. Visit a business that is using data processing technology.
2. Bring in articles pertaining to home and business data processing applications.
3. Invite a speaker to discuss benefits of data processing technology.
4. View films and filmstrips.
5. Prepare bulletin boards illustrating business and home computer applications.
6. Develop a bingo game using cards with data processing terms.
7. Examine classified newspaper ads for employment opportunities in data processing.

UNIT OUTLINE

FUNDAMENTAL DATA PROCESSING CONCEPTS

I. Data Processing Fundamentals

   A. Terminology
   B. Data Processing versus information processing

- C. Systems
  - 1. manual
  - 2. mechanical
  - 3. punch-card/tape
  - 4. computer
- D. Operations
  - 1. originating (recording)
  - 2. classifying and sorting
  - 3. storing and retrieving
  - 4. summarizing
  - 5. analyzing (calculating)
  - 6. communicating
- E. Cycle
  - 1. input
  - 2. processing
  - 3. output
  - 4. communicating

II. Evolution of the Computer Industry

- A. Equipment
- B. Development
- C. Human adaptations
- D. Costs

III. Business Applications

- A. Needs and uses
- B. Advantages and disadvantages

IV. Home Applications

- A. Needs and uses
- B. Advantages and disadvantages

SPECIFIC PERFORMANCE OBJECTIVES AND LEARNING ACTIVITIES

---

1. On a written test, students will be able to define basic data processing terminology with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Terminology	1. Complete the crossword puzzle after reviewing basic data processing terms. (Appendix A)

2. Complete the scrambled words activity after reviewing basic data processing terms. (Appendix B)

3. Complete a handout of terms and definitions as required by the teacher.

---

2. On a written test, students will be able to discuss with at least 75 percent accuracy the similarities between data processing and information processing.

Subject Matter Content	Learning Activities
Data Processing versus Information Processing	1. Read and discuss various definitions of data processing and information processing. 2. Prepare a bulletin board stressing the similarities of data processing and information processing.

---

3. On a written test, students will be able to describe with 75 percent accuracy the purpose of typical equipment used in data processing.

Subject Matter Content	Learning Activities
Systems	1. Prepare a bulletin board display depicting several pieces of data processing equipment. 2. View transparencies that depict the latest equipment on the market. 3. Describe special features of equipment using brochures from equipment dealers. 4. View a demonstration of data processing equipment in operation. 5. Visit a computer salesroom.

4. On a written test, students will be able to differentiate among the four types of data processing systems with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Systems	1. View transparencies that illustrate each type of data processing system. 2. Prepare a bulletin board that displays data processing equipment used in the four types of systems. 3. Operate various pieces of data processing equipment. 4. View a film which illustrates the processing of data by the four different systems.

5. On a written test, students will be able to classify statements relating to the six data processing operations with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Operations	1. Read and discuss various definitions of data processing found in current periodicals. 2. As a group project, construct a crossword puzzle using the data processing terms. 3. Working in small groups, give at least two examples of each of the data processing operations. 4. Complete a worksheet which contains statements of data processing operations to classify. (Appendix C)

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6. In class, students will be able to trace the development of data processing from previous centuries to the present time.

Subject Matter Content	Learning Activities
Development	1. View film(s) illustrating the development of data processing.
	2. View transparencies which present an overview of the development of the data processing industry.
	3. Make a poster or transparency that summarizes the growth of the data processing industry.
	4. Prepare a report on some early type of data processing equipment.

---

7. In class, students will be able to examine reasons for the difficulties in accepting changing technology.

Subject Matter Content	Learning Activities
Human Adaptations	1. Discuss in small groups the changes that may occur when new technology is introduced in the home and business.
	2. In small groups, choose a technology such as electricity and discuss how it has changed, is changing, and may change our society.
	3. Present the groups' conclusions from Activity 2 to the class.

---

8. In class, students will be able to examine costs in computerizing.

Subject Matter Content	Learning Activities
Costs	1. View a film that illustrates changing from manual to computer data processing.

2. Examine computer catalogs with emphasis on costs.

3. Prepare a list of costs involved in purchasing a microcomputer and other equipment and software to be able to do worksheet calculations.

4. Collect several financial statements covering companies before and after computerization.

---

9. Students will be able to express at least two possible needs and uses of data processing technology in various business applications such as to transportation, crime control, education, community services, medicine, and government.

Subject Matter Content	Learning Activities
Business Applications Needs and Uses	1. Study pamphlets and magazines for new high tech items for sale. 2. In small groups, prepare a list of needs and uses for each chosen area of data processing technology. 3. Interview a manager to obtain a list of the uses of the computer in his or her company.

---

10. Students will be able to debate the advantages and disadvantages of data processing technology in business applications.

Subject Matter Content	Learning Activities
Business Applications Advantages and Disadvantages	1. View a film which illustrates how data processing technology has been applied in business. 2. Read and discuss several magazine articles on the subject of data processing. 3. Organize a class debate on the pros and cons of data processing technology in business.

11. On a written test, students will be able to discuss at least five possible needs and uses of data processing technology in the home.

Subject Matter Content	Learning Activities
Home Applications Needs and Uses	1. Prepare a poster on each area chosen that will illustrate the use of data processing.
	2. Discuss in small groups the uses of data processing in the home and report to the class.
	3. Formulate a list of prospective changes every student could implement in the home.

12. Students will be able to debate the advantages and disadvantages of data processing technology in the home.

Subject Matter Content	Learning Activities
Home Applications Advantages and Disadvantages	1. View several films in which data processing technology has been applied in the home.
	2. Prepare a slide presentation in defense of either the pro or con stand on data processing technology in the home.
	3. Organize a class debate on the pros and cons of data processing technology in the home.

13. Given selected information on a written test, students will be able to identify the appropriate phase of the data processing cycle under which the information would be categorized with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Cycle	1. Prepare a list with several examples of each phase of the data processing cycle.

2. Prepare one or more transparencies on the phases of data processing.

---

14. On a written test, students will be able to give three examples of how the computer has restructured business and the nature of jobs.

Subject Matter Content	Learning Activities
Business Applications	1. Visit a company that uses data processing technology. 2. Review articles which provide examples, and summarize orally for the class. 3. Discuss in small groups the kinds of jobs available in business today and the knowledges and skills needed.

---

15. Students will be able to prepare a two-page report summarizing the applications that account for the greatest use of business and/or home computing resources.

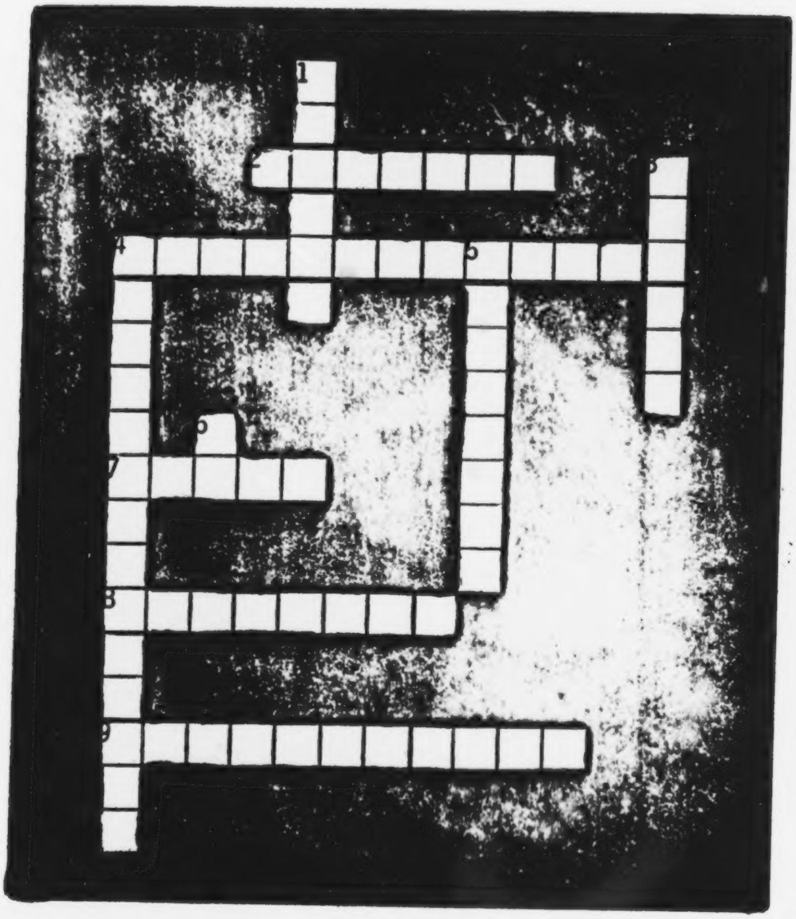
Subject Matter Content	Learning Activities
Business Applications and Home Applications	1. Review advertisements and articles relating to popular business and personal-use software. 2. Discuss in small groups the most frequent uses of the computer in businesses and in the home. 3. Interview a computer marketing or sales representative to determine the most popular business and home uses of the computer. 4. Present written reports to the class.

16. Given statements related to data processing fundamentals and terminology on a written test, students will be able to identify terms correctly or to indicate if a statement is true or false, with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Data Processing Fundamentals	1. Write two true/false questions related to the unit. 2. Form teams and compete to answer the questions developed in the above activity. 3. Form teams and compete in a word definition game.

APPENDIX A

DATA PROCESSING TERMINOLOGY



ACROSS

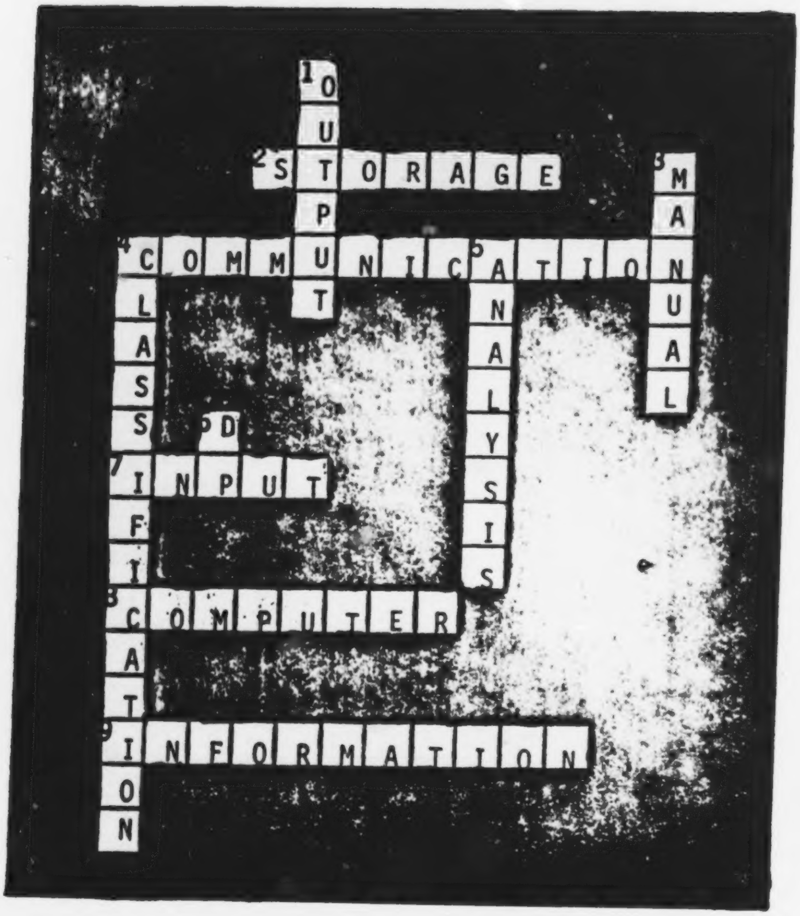
2. Putting something away for future use.
4. Sharing information from one person to another.
7. To supply data, programs, etc., to a computer.
8. An electronic machine for making calculations, storing and analyzing information put into it.
9. Data in a form that makes it immediately useful for decision making.

DOWN

1. The information produced by a data processing system.
3. Processing data by hand, using pencil and paper.
4. Separating recorded data by type.
5. The methodical examination of data to reveal their underlying relationship.
6. Abbreviation for data processing.

APPENDIX A

ANSWER KEY


1 OUTPUT
2 STORAGE
3 MANUAL
4 COMMUNICATION
4 CLASSIFICATION
5 ANALYSIS
DP
7 INPUT
8 COMPUTER
9 INFORMATION

ACROSS

2. Putting something away for future use.
4. Sharing information from one person to another.
7. To supply data, programs, etc., to a computer.
8. An electronic machine for making calculations, storing and analyzing information put into it.
9. Data in a form that makes it immediately useful for decision making.

DOWN

1. The information produced by a data processing system.
3. Processing data by hand, using pencil and paper.
4. Separating recorded data by type.
5. The methodical examination of data to reveal their underlying relationship.
6. Abbreviation for data processing.

APPENDIX B

FUNDAMENTAL DATA PROCESSING CONCEPTS

SCRAMBLED WORDS

1. lamnua
2. cedingorr
3. rotsing
4. puitn
5. adta
6. crosseignp
7. monicamuntico
8. mourcpet
9. eviltarer
10. zarasumitmoin
11. lasanyis
12. lalacucontis
13. falconisasitic
14. aadt grossceinp
15. miatoonfirn

APPENDIX B

ANSWER KEY

1.	lamnua	manual
2.	cedingorr	recording
3.	rotsing	storing or sorting
4.	puitn	input
5.	adta	data
6.	crosseignp	processing
7.	monicamuntico	communication
8.	mourcpet	computer
9.	eviltarer	retrieval
10.	zarasumitmoin	summarization
11.	lasanyis	analysis
12.	lalacucontis	calculations
13.	falconisasitic	classification
14.	aadt grossceinp	data processing
15.	miatoonfirn	information

APPENDIX B

FUNDAMENTAL DATA PROCESSING CONCEPTS

SCRAMBLED WORDS

1. lamnua ____________________
2. cedingorr ____________________
3. rotsing ____________________
4. puitn ____________________
5. adta ____________________
6. crosseignp ____________________
7. monicamuntico ____________________
8. mourcpet ____________________
9. eviltarer ____________________
10. zarasumitmoin ____________________
11. lasanyis ____________________
12. lalacucontis ____________________
13. falconisasitic ____________________
14. aadt grossceinp ____________________
15. miatoonfirn ____________________

APPENDIX C

ANSWER KEY

Directions: Using the list in Column B, select the operation that best describes each statement, and write the letter that represents your answer in the space next to each question.

Column A

A 1. Purchase order

A 2. Sales ticket

C 3. Filing a record of each customer's sales transaction

D 4. Financial statement

F 5. Sending all past-due accounts to a collection agency

A 6. Checks

B 7. Arranging mail by departments

A 8. Invoice

D 9. Total of all employees who have group insurance

E 10. Tallying all sales for a given period of time

F 11. Announcing company policy change

E 12. Assessing company assets and liabilities

B 13. Arranging bills according to due date

C 14. Checking amount due from previous months

F 15. Sending a letter

Column B

A. Originating (recording)

B. Classifying and sorting

C. Storing and retrieving

D. Summarizing

E. Analyzing (calculating)

F. Communicating

APPENDIX C

DATA PROCESSING OPERATIONS

Directions: Using the list in Column B, select the operation that best describes each statement, and write the letter that represents your answer in the space next to each question.

Column A

___ 1. Purchase order

___ 2. Sales ticket

___ 3. Filing a record of each customer's sales transaction

___ 4. Financial statement

___ 5. Sending all past-due accounts to a collection agency

___ 6. Checks

___ 7. Arranging mail by departments

___ 8. Invoice

___ 9. Total of all employees who have group insurance

___10. Tallying all sales for a given period of time

___11. Announcing company policy change

___12. Assessing company assets and liabilities

___13. Arranging bills according to due date

___14. Checking amount due from previous months

___15. Sending a letter

Column B

A. Originating (recording)

B. Classifying and sorting

C. Storing and retrieving

D. Summarizing

E. Analyzing (calculating)

F. Communicating

UNIT TEST continued

B. MATCHING

Directions: Using the list in Column B, select the operation that best describes each statement and write the letter that represents your answer in the space next to each statement.

Column A

_____1. A list of students making a 4.00 average

_____2. Sending an article to be published in the local newspaper

_____3. Writing a purchase invoice

_____4. Placing all of the blue cards in one stack and yellow in another

_____5. A bank statement

Column B

A. Originating (recording)

B. Classifying and sorting

C. Storing and retrieving

D. Summarizing

E. Analyzing (calculating)

F. Communicating

C. MULTIPLE CHOICE

Directions: In the blank space next to each question, write the letter (A, B, C, or D) of the choice that answers the question best.

_____1. Recording information by hand (using documents such as worksheets, journals, and ledgers) is classified as which type of data processing system?

A. Manual
B. Mechanical
C. Punch-card/tape
D. Computer

_____2. Word processors would be classified as which type of data processing system?

A. Manual
B. Mechanical
C. Punch-card/tape
D. Computer

_____3. Entering information into the computer is which part of the data processing cycle?

A. input
B. processing
C. output
D. communicating

_____4. The manipulation of information is which part of the data processing cycle?

A. input
B. processing
C. output
D. communicating

_____5. To get stored information from a computer is?

A. classifying
B. verifying
C. byte
D. retrieving

D. TRUE/FALSE

Directions: Write T for true or F for false in the blank space next to each statement.

_____1. Storing and retrieving is a data processing operation.

_____2. Communicating is part of the data processing cycle as well as a data operation.

_____3. Fourth generation computers are the most sophisticated.

_____4. As computers have developed, computer components have increased in size.

_____5. Many people have difficulty adjusting to changing technology.

_____6. In a decision to computerize, costs should be a consideration.

_____7. Data processing technology is an important element in crime control.

_____ 8. The job market is unaffected by computer technology.

_____ 9. Byte and bit are identical terms.

_____10. Computer piracy is legal in Louisiana.

E. ESSAY

Directions: Discuss each item using complete sentences.

1. Discuss the similarities between data processing and information processing.

2. Discuss five possible needs and uses of data processing technology in the home.

3. Give three examples of how the computer has restructured business and the nature of the jobs which have been created.

4. Discuss the purpose of a disk drive and a printer.

UNIT TEST

ANSWER KEY

A. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents your answer in the space next to each question.

Column A

__H__ 1. To supply information to a computer.

__C__ 2. An electronic machine which calculates, stores and analyzes information.

__E__ 3. A collection of raw facts

__J__ 4. The information produced by a data processing system.

__B__ 5. Act of sharing from one person to another

__K__ 6. An output device which creates print on page.

__I__ 7. A device which allows impulses to be transmitted over a telephone.

__M__ 8. Act of putting something away for future use.

__A__ 9. The methodical examination of data to reveal their underlying relationship.

__D__ 10. Abbreviation for data processing

Column B

A. Analysis
B. Communication
C. Computer
D. DP
E. Data
F. IP
G. Information Processing
H. Input
I. Modem
J. Output
K. Printer
L. Sort
M. Storing
N. Terminals

UNIT TEST continued

B. MATCHING

Directions: Using the list in Column B, select the operation that best describes each statement and write the letter that represents your answer in the space next to each statement.

Column A

_D_ 1. A list of students making a 4.00 average

_F_ 2. Sending an article to be published in the local newspaper

_A_ 3. Writing a purchase invoice

_B_ 4. Placing all of the blue cards in one stack and yellow in another

_D_ 5. A bank statement

Column B

A. Originating (recording)

B. Classifying and sorting

C. Storing and retrieving

D. Summarizing

E. Analyzing (calculating)

F. Communicating

C. MULTIPLE CHOICE

Directions: In the blank space next to each question, write the letter (A, B, C, or D) of the choice that answers the question best.

_A_ 1. Recording information by hand (using documents such as worksheets, journals, and ledgers) is classified as which type of data processing system?

A. Manual
B. Mechanical
C. Punch-card/tape
D. Computer

_D_ 2. Word processors would be classified as which type of data processing system?

A. Manual
B. Mechanical
C. Punch-card/tape
D. Computer

UNIT TEST continued

A 3. Entering information into the computer is which part of the data processing cycle?

A. input
B. processing
C. output
D. communicating

B 4. The manipulation of information is which part of the data processing cycle?

A. input
B. processing
C. output
D. communicating

D 5. To get stored information from a computer is?

A. classifying
B. verifying
C. byte
D. retrieving

D. TRUE/FALSE

Directions: Write T for true or F for false in the blank space next to each statement.

T 1. Storing and retrieving is a data processing operation.

T 2. Communicating is part of the data processing cycle as well as a data operation.

T 3. Fourth generation computers are the most sophisticated.

F 4. As computers have developed, computer components have increased in size.

T 5. Many people have difficulty adjusting to changing technology.

T 6. In a decision to computerize, costs should be a consideration.

T 7. Data processing technology is an important element in crime control.

F 8. The job market is unaffected by computer technology.

F 9. Byte and bit are identical terms.

F 10. Computer piracy is legal in Louisiana.

E. ESSAY

Directions: Discuss each item using complete sentences.

1. Discuss the similarities between data processing and information processing.

   Data processing is a means of putting information into a usable form. Information processing is using information necessary for decision making.

2. Discuss five possible needs and uses of data processing technology in the home.

   A. Data processing technology can be used in the home for crime prevention by the installation of security systems.

   B. In many areas, the telephone company has a special "911" number which can be dialed in an emergency. Help is automatically dispatched when the number is dialed.

   C. Computerized thermostats can be used to regulate temperature automatically.

   D. Many small appliances, such as coffee pots, washer and dryers, and dishwashers, can be preset as determined by the user.

   E. Inventory of household items, cooking ingredients, etc., can be kept on the computer.

3. Give three examples of how the computer has restructured business and the nature of the jobs which have been created.

   A. In hospitals, medical technology labs use computers for running blood tests. The computer operates more rapidly and without the element of human interpretation, thereby making it more accurate. Employees must have knowledge of computer operations to function in the lab.

B. Many department stores use computerized inventory. Every time a purchase is made, an entry to the register depletes the inventory so that employers have knowledge of what is in stock at all times. Employees must have knowledge of how to operate the register.

C. Many supermarkets use scanning devices at their checkout counters. Scanners are fast and accurate. The potential human error is decreased significantly. Employees must be trained in the operation of scanners.

4. Discuss the purpose of a disk drive and a printer.

The disk drive is used to load the diskette which provides a means of getting the program into the memory of the computer. The printer provides a hard copy of information in the computer.

EVALUATION AND TESTING

Ways to Evaluate Pupil Growth

- Class debate
- Class notebook
- Class participation
- Group participation
- Oral report
- Unit test
- Written test

EQUIPMENT AND SUPPLIES

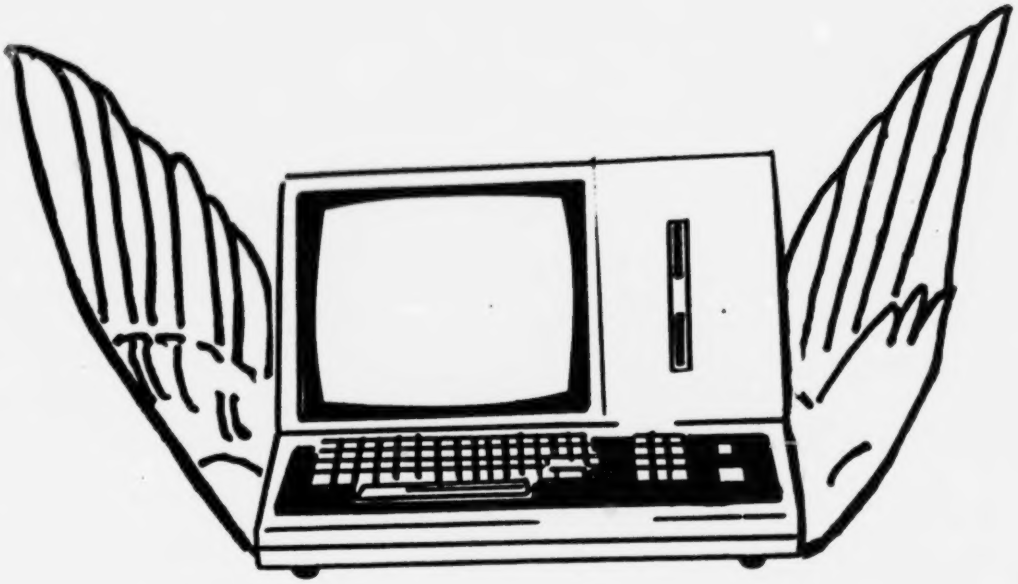
Student

Textbooks
Notebook
Data Processing Equipment
Newspapers
Computer Equipment and Supply Catalogs
Periodicals
Data Processing Reference Books

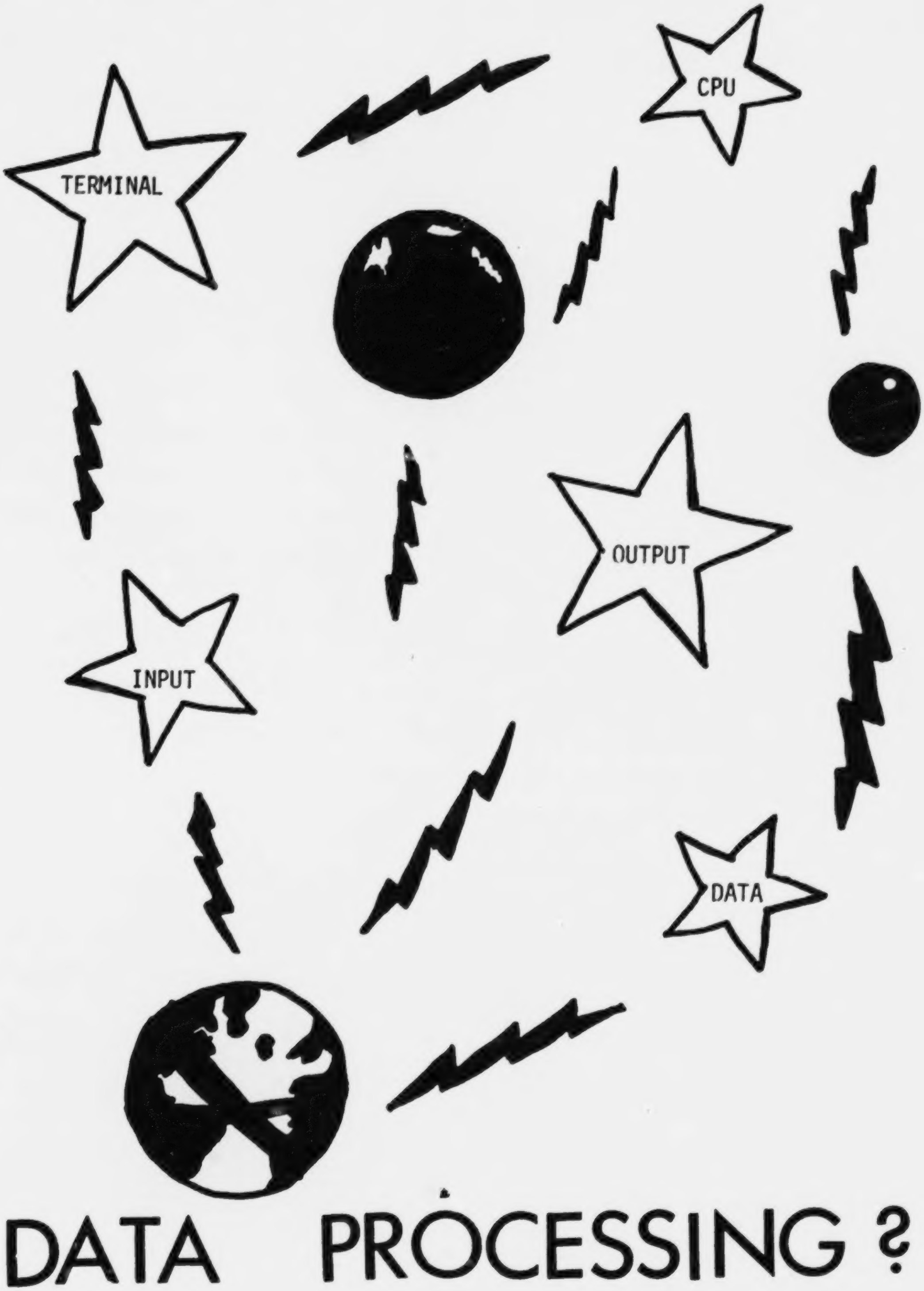
Teacher

Textbook and Manual
Transparencies (commercial and self-made)
Bulletin Board Materials
Job Descriptions for Data Processing Jobs
Filmstrip Projector
Overhead Projector
Data Processing Equipment Brochures
Data Processing Periodicals

FLY INTO THE FUTURE



CAN WE TALK


CPU
TERMINAL
OUTPUT
INPUT
DATA

DATA PROCESSING ?

SUPPLEMENTARY MATERIALS

Films

Computers in Your Life
(15978) (16mm, 13 minutes, free borrowing provisions)
Modern Talking Picture Service
Film Scheduling Center
500 Park Street, North
St. Petersburg, FL 33709

Computers, What Are They Anyway
(16825) (16mm, 10 minutes, free borrowing provisions)
Modern Talking Picture Service
Film Scheduling Center
500 Park Street, North
St. Petersburg, FL 33709

The Information Machine
(3352) (16mm, 10 minutes, free borrowing provisions)
Modern Talking Picture Service
Film Scheduling Center
500 Park Street, North
St. Petersburg, FL 33709

Filmstrips/Cassettes

The Computer Revolution
DX1036-7
Prentice-Hall Media
ServCode DX
150 White Plains Road
Tarrytown, NY 10591

Computer Terminology Beginning
Series 6350
RMI Media Productions
120 West 72nd Street
Kansas City, MO 64114
(800) 821-5480

Disk Operating Systems
Series 6353
RMI Media Productions
120 West 72nd Street
Kansas City, MO 64114

Getting to Know the Micros
Number 1089.23
Prentice-Hall Media
150 White Plains Road
Tarrytown, NY 10591

SUPPLEMENTARY MATERIALS continued

Introduction to Automated Data Processing
Catalog No. J527-1 Volume 1
Catalog No. J527-2 Volume 2
(Teacher's Manual J5271M, J5272M)
South-Western Publishing
11310 Gemini Lane
Dallas, TX 75229

Radio Shack Model III Operations
Series 6300
RMI Media Productions, Inc.
2807 W. 47th Street
Shawnee Mission, KS 66205

Understanding Computers
Prismatron Productions, Inc.
155 Buena Vista Avenue
Mill Valley, CA 94941

Periodicals

Computer Products
Gordon Publications Inc.
P. O. Box 1952
Dover, NJ 07801-0952

The Computing Teacher
Department of Computer and Information Science
University of Oregon
Eugene, OR 97403

Datamation
Technical Publishing
875 Third Avenue
New York, NY 10022

80 Micro
CW Communications/Peterborough, Inc.
80 Pine Street
Peterborough, NH 03458

InCider
CW Communications/Peterborough, Inc.
80 Pine Street
Peterborough, NH 03458

SUPPLEMENTARY MATERIALS continued

Popular Computing
McGraw-Hill, Inc.
70 Main Street
Peterborough, NH 03458

T.H.E. Journal
Information Synergy, Inc.
2922 S. Daimler Street
Santa Ana, CA 92705

Software

Business Applications

4M-500
(Available for Apple II with 48K)
Opportunities for Learning, Inc.
20417 Nordhoff Street, Dept. 9F
Chatsworth, CA 91311

Transparencies

Introduction to Data Processing (J526) (Teacher's Manual J526M)
South-Western Publishing Company
11310 Gemini Lane
Dallas, TX 75229

RESOURCES

Brabb, George J., and Gerald W. McKean. *Business Data Processing*. Boston: Houghton Mifflin Company, 1982.

Clark, James F., and Judith J. Lambrecht. *Information Processing Concepts, Principles, and Procedures*. Cincinnati: South-Western Publishing Co., 1985.

Daggett, Willard R., Kamiran S. Badrkhan, and Benedict Kruse. *Computers and Information Technology*. Cincinnati: South-Western Publishing Company, 1985.

Gore, Marvin R., and John W. Stubbe. *Computers and Data Processing*. New York: McGraw-Hill Book Company, 1979.

Kroenke, David M. *Business Computer Systems, An Introduction*. 2nd ed. Santa Cruz, CA: Mitchell Publishing, Inc., 1984.

Mandell, Steven L. *Computers and Data Processing Concepts and Applications*. 3rd ed. St. Paul: West Publishing Company, 1985.

Spencer, Donald D. *Computer Dictionary*. Rev. ed. Columbus, Ohio: Charles E. Merrill Publishing Company, 1983.

Spencer, Donald D. *Computers and Information Processing*. Columbus, Ohio: Charles E. Merrill Publishing Company, 1983.

Stern, Robert A., and Nancy Stern. *An Introduction to Computers and Information Processing*. 2nd ed. New York: John Wiley & Sons, 1985.

Wanous, S. J., Gerald E. Wagner, and Judith J. Lambrecht. *Fundamentals of Data Processing*. 2nd ed. Cincinnati: South-Western Publishing Company, 1981.

Wood, Merle. *Computer Awareness*. Cincinnati: South-Western Publishing Company, 1972.

UNIT II

DATA ENTRY

INTRODUCTION

Before computers provide final results, data must be entered into the system. Accurate data entry is an essential requirement in obtaining accurate final information. Data entry skills are useful for both individuals who plan to obtain positions as data entry operators and for those whose goals are jobs in which data entry is one component of their overall work responsibilities.

This unit is designed to provide students with a foundation in data entry concepts and procedures.

COMPETENCIES

1. Demonstrate correct operational procedures and maintenance of data entry equipment.
2. Enter data using available data entry equipment.

GENERAL PERFORMANCE OBJECTIVES/GOALS

1. Prepare various source documents for keying.
2. Operate and properly care for all data entry equipment.
3. Demonstrate correct and efficient keyboarding techniques.
4. Discuss data entry equipment trends.

SPECIFIC PERFORMANCE OBJECTIVES AND MASTERY CRITERIA

1. On a written test, students will be able to write an acceptable definition of data entry with at least 75 percent accuracy.
2. On a written test, students will be able to identify terms related to data entry with at least 75 percent accuracy.
3. Given a series of source documents, students will be able to make the necessary preparations for data entry with at least 75 percent accuracy.

4. Provided with a data entry device and exercises, students will be able to key data with at least 75 percent accuracy within a time span established by the teacher on each kind of data entry device available in class.

5. On a written test, students will be able to list and discuss three procedures for the proper care of a diskette with at least 75 percent accuracy.

6. Given a diagram of a diskette (floppy disk) on a written test, students will be able to identify the components with at least 75 percent accuracy.

7. Students will be able to demonstrate the procedures for powering up a microcomputer, loading a program, selecting an option from a menu, and powering down the computer with 100 percent accuracy.

8. On a written test, students will be able to list a unique feature of each data entry device discussed in class with at least 75 percent accuracy.

9. In class, students will be able to contrast advantages of using various kinds of data entry equipment.

10. Given a list of data entry devices on a written test, students will be able to identify an appropriate business application for which each could be used.

11. On a written test, students will be able to list and discuss three current trends in the entry of data.

METHODOLOGY

The purpose of this unit is to provide students with a foundation in data entry concepts and procedures. Activities will be provided to prepare students to operate data entry equipment.

Books, operators' manuals, prepared software, and other items listed in the supplementary materials section of this unit may be used to enrich teacher lectures.

SUGGESTED INTEREST APPROACHES

1. Invite a representative to demonstrate various data entry equipment and explain the value of skills learned on such equipment.

2. Take a field trip to a local business that uses various data entry equipment.

3. Have students prepare bulletin board displays to illustrate important aspects of data entry.

4. Provide the opportunity for students to change the ribbons on various printing devices using the machine operator's guides.

5. Schedule the customer engineer from the equipment manufacturer to demonstrate correct maintenance procedures according to manufacturer's specifications. Ask the representative to point out problems that are inherent in particular pieces of hardware.

6. Have students complete word puzzles containing data entry terms.

UNIT OUTLINE

DATA ENTRY

I. Fundamentals of Data Entry

   A. Terminology
   B. Source document preparation
      1. computations
      2. verification
      3. other
   C. Keyboard skills
      1. numeric keys
      2. alphabetic keys
      3. special function keys

II. Data Entry Equipment

   A. Card punch
      1. storage media
      2. procedures
   B. Key-to-tape device
      1. storage media
      2. procedures
   C. Key-to-disk device
      1. storage media
      2. procedures
   D. On-line terminals
      1. storage media
      2. procedures
   E. Microcomputer
      1. diskettes
         a. care
         b. components
      2. system startup
      3. program loading

        4. data entry
        5. data storage
        6. computer power-down

III. Data Entry Equipment Trends

    A. Comparison of equipment uses
    B. Trends in the high-tech environment

SPECIFIC PERFORMANCE OBJECTIVES AND LEARNING ACTIVITIES

---

1. On a written test, students will be able to write an acceptable definition of data entry with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Fundamentals of Data Entry Terminology	1. Read and discuss various definitions of data entry.
	2. Prepare a bulletin board display that will depict an understanding of data entry.
	3. View transparencies that illustrate the process of data entry.
	4. Write a definition of data entry in class notebook.

---

2. On a written test, students will be able to identify terms related to data entry with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Fundamentals of Data Entry Terminology	1. Compose matching questions related to data entry terminology.
	2. Divide into groups and compete in a scrabble word game using materials from the previous activity.
	3. Create a word search game using the data entry terminology.
	4. Complete a scrambled word exercise using data entry terminology. (Appendix A)

3. Given a series of source documents, students will be able to make the necessary preparations for data entry with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Source Document Preparation	1. Complete the necessary source documents for a payroll data entry activity. (Appendix B) 2. Complete the necessary preparations for invoices for a data entry activity. (Appendix C) 3. Complete textbook and/or workbook activities relating to preparation of source documents for data entry. 4. Begin a practice set or computer simulation activity which requires preparation of source documents for data entry. 5. Turn in completed documents for evaluation by the teacher.

4. Provided with a data entry device and exercises, students will be able to key data with at least 75 percent accuracy within a time span established by the teacher on each type of data entry device available in class.

Subject Matter Content	Learning Activities
Keyboard Skills	1. Complete dexterity drills for both numeric keys and alphabetic keys. 2. Observe a demonstration of the use of the special function keys of the various data entry devices available in class. 3. Complete textbook and/or workbook activities involving the entry of data at a data entry device. 4. Continue a practice set or computer simulation activity which requires entry of source documents at a data entry device.

5. On a written test, students will be able to list and discuss three procedures for the proper care of a diskette with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Microcomputer Diskettes	1. View transparencies which illustrate do's and don't's of the care of diskettes. 2. As a small group activity, discuss the proper care of a computer diskette. 3. Prepare a list of acceptable diskette care procedures and enter the list in a class notebook.

6. Given a diagram of a diskette (floppy disk) on a written test, students will be able to identify the components with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Microcomputer Diskettes	1. View transparencies which illustrate the various components of a diskette. 2. Prepare a bulletin board illustrating the various parts of a diskette. 3. Examine an old diskette which has been cut apart.

7. Students will be able to demonstrate the procedures for powering up a microcomputer, loading a program, selecting an option from a menu, and powering down the computer with 100 percent accuracy.

Subject Matter Content	Learning Activities
Microcomputer	1. Scan the operator's manual in small groups during teacher instruction. 2. Observe a demonstration on how to properly load and remove diskettes.

3. Observe a demonstration on how to power up the microcomputer, load a program, select an option from the menu, and power down the computer.
4. Demonstrate how to power up and power down the system to another class member.
5. Demonstrate how to power up the system, load a program, select an option from menu, and power down the system.

---

8. On a written test, students will be able to list a unique feature of each data entry device discussed in class with at least 75 percent accuracy.

Subject Matter Content

Data Entry Equipment
  Card punch
  Key-to-tape device
  Key-to-disk device
  Microcomputer
  On-line terminals

Learning Activities

1. View transparencies which illustrate the various data entry devices.
2. In a small group, discuss the different features of the various data entry devices.
3. Prepare a bulletin board illustrating unique features of each data entry device.

---

9. In class, students will be able to contrast advantages of using various types of data entry equipment.

Subject Matter Content

Data Entry Equipment
  Card punch
  Key-to-tape device
  Key-to-disk device
  Microcomputer
  On-line terminals

Learning Activities

1. React to a presentation by a data processing manager on the advantages and disadvantages of various types of data entry equipment.
2. Read articles relating to various types of data entry equipment.

3. Share findings with the class.

4. Write a brief report comparing two data entry devices.

---

10. Given a list of data entry devices on a written test, students will be able to identify an appropriate business application for which each could be used.

Subject Matter Content	Learning Activities
Comparison of Equipment Uses	1. View transparencies which depict various data entry devices and their applications.
	2. Interview data processing personnel concerning the kinds of business applications in their company and the means of data entry.
	3. Share findings from the previous activity with the class.
	4. Prepare a list of various devices and possible business applications appropriate for each data entry device.
	5. Read articles concerning data entry devices and applications.

---

11. On a written test, students will be able to list and discuss three current trends in the entry of data.

Subject Matter Content	Learning Activities
Data Entry Equipment Trends	1. React to a presentation by a sales representative on trends in data entry equipment.
	2. Read articles concerning trends in data entry.
	3. Construct a display illustrating current trends in data entry.
	4. In a small group, discuss trends in data entry.

APPENDIX A

WORD SCRAMBLE

Directions: Unscramble the following words:

1. oscure omtcuden
2. taad
3. kitedste
4. no-neil mstraenils
5. dbearkyo
6. tonimor
7. kisd revid
8. sucorr
9. atda nyert
10. tidertxye
11. taad crosesngpi
12. tniup
13. nocdee
14. nuncfito yesk
15. bumern dap

APPENDIX A

ANSWER KEY

Directions: Unscramble the following words:

1.	oscure omtcuden	source document
2.	taad	data
3.	kitedste	diskette
4.	no-neil mstraenil	on-line terminals
5.	dbearkyo	keyboard
6.	tonimor	monitor
7.	kisd revid	disk drive
8.	sucorr	cursor
9.	atda nyert	data entry
10.	tidertxye	dexterity
11.	taad crosesngpi	data processing
12.	tniup	input
13.	nocdee	encode
14.	nuncfito yesk	function keys
15.	bumern dap	number pad

APPENDIX B

PAYROLL FORMS

Payroll type S*

Employee Name Jones, Tamara

Soc. Sec. 438-67-1115

Dept. 20 Clock 26

Salary 450.00

Withholding**

FICA ______
Fed Inc ______
Sta Inc ______

Total Earnings ______
Less Withholdings ______
Net Pay ______

Payroll type S

Employee Name Natsmi, Clarence

Soc. Sec. 437-63-1705

Dept. 5 Clock 21

Salary 285.00

Withholding**

FICA ______
Fed Inc ______
Sta Inc ______

Total Earnings ______
Less Withholdings ______
Net Pay ______

Payroll Type H*

Employee Name Hall, Tillman

Soc. Sec. 472-88-0000

Dept. 31 Clock 36

Hrly Rate 6.35 Hrs: Reg. 40 OT 10

Earnings		Withholding**	
Regular	______	FICA	______
Overtime	______	Fed Inc	______
		Sta Inc	______

Total Earnings ______
Less Withholding ______
Net Pay ______

Payroll Type H

Employee Name Chenevert, Doris

Soc. Sec. 888-00-1111

Dept. 15 Clock 31

Hrly Rate 4.95 Hrs: Reg. 40 OT 4

Earnings		Withholding**	
Regular	______	FICA	______
Overtime	______	Fed Inc	______
		Sta Inc	______

Total Earnings ______
Less Withholding ______
Net Pay ______

S*--Salaried Worker
H*--Hourly Worker

APPENDIX B

ANSWER KEY

Payroll type S*

Employee Name Jones, Tamara

Soc. Sec. 438-67-1115

Dept. 20 Clock 26

Salary 450.00

Withholding**

FICA 27.23
Fed Inc 37.20
Sta Inc 6.60

Total Earnings 450.00
Less Withholdings 71.03
Net Pay 378.97

Payroll type S

Employee Name Natsmi, Clarence

Soc. Sec. 437-63-1705

Dept. 5 Clock 21

Salary 285.00

Withholding**

FICA 17.24
Fed Inc 62.40
Sta Inc 9.35

Total Earnings 285.00
Less Withholdings 88.99
Net Pay 196.01

Payroll Type H*

Employee Name Hall, Tillman

Soc. Sec. 472-88-0000

Dept. 31 Clock 36

Hrly Rate 6.35 Hrs: Reg. 40 OT 10

Earnings

Regular 254.00
Overtime 95.25

Withholding**

FICA 21.13
Fed Inc 30.60
Sta Inc 5.97

Total Earnings 349.25
Less Withholding 57.70
Net Pay 291.55

Payroll Type H

Employee Name Chenevert, Doris

Soc. Sec. 888-00-1111

Dept. 15 Clock 31

Hrly Rate 4.95 Hrs: Reg. 40 OT 4

Earnings

Regular 198.00
Overtime 29.70

Withholding**

FICA 13.78
Fed Inc 34.20
Sta Inc 6.43

Total Earnings 227.70
Less Withholding 54.41
Net Pay 173.29

S*--Salaried Worker
H*--Hourly Worker

**Based on 1985 rate of 6.05% for FICA. Other withholding from 1985 tax tables. Answers would change when tax tables and rates change.

APPENDIX C

ACCOUNTS RECEIVABLE INVOICE

S O T L O D	Barbara Rafferty 1145 Louisiana Avenue Patterson, LA 70392	Invoice No. Terms Customer No. Date	8204 1/15, N/30 180221 4/11/85

Quantity	Catalog No.	Description	Unit	Price	Extension
12	12175	Mortar Mix 80 lb	Bag	3.70	
43	15008	Fine Sand	Ton	35.00	
14	19326	Pea Gravel	Ton	45.00	
22	18790	Bags Concrete 80 lb	Each	3.70	
			Purchase		
			Tax 6%		
			Total		
			Pay Last Amount in this Column →		

APPENDIX C

ANSWER KEY

S
O T
L O
D

Barbara Rafferty
1145 Louisiana Avenue
Patterson, LA 70392

Invoice No. 8204
Terms 1/15, N/30
Customer No. 180221
Date 4/11/85

Quantity	Catalog No.	Description	Unit	Price	Extension
12	12175	Mortar Mix 80 lb	Bag	3.70	44.40
43	15008	Fine Sand	Ton	35.00	1505.00
14	19326	Pea Gravel	Ton	45.00	630.00
22	18790	Bags Concrete 80 lb	Each	3.70	81.40
			Purchase		2260.80
			Tax 6%		135.65
			Total		2396.45
			Pay Last Amount in this Column →		

APPENDIX C

ACCOUNTS RECEIVABLE INVOICE

SOLD TO	Robert C. Johnson	Invoice No.	6902
	27 Hickory Street	Terms	1/15, N/30
	Morgan City, LA 70380	Customer No.	102648
		Date	4/08/85

Quantity	Catalog No.	Description	Unit	Price	Extension
21	18709	2 X 4 Stand Alone S-Dry 12"	EA	2.00	
150	13706	5" Tinned Circle Bend	EA	3.48	
54	16741	Chair Rail 5-1/4" X 15'	EA	6.30	
6	18249	Roof Paper 50 sq. ft.	ROLL	16.47	
39	18017	4 X 8 Gas Ply 1/4"	EA	18.24	
			Purchase		
			Tax 7%		
			Total		
			Pay Last Amount in this Column →		

APPENDIX C

ANSWER KEY

S
O T
L O
D

Robert C. Johnson
27 Hickory Street
Morgan City, LA 70380

Invoice No. 6902
Terms 1/15, N/30
Customer No. 102648
Date 4/08/85

Quantity	Catalog No.	Description	Unit	Price	Extension
21	18709	2 X 4 Stand Alone S-Dry 12"	EA	2.00	42.00
150	13706	5" Tinned Circle Bend	EA	3.48	522.00
54	16741	Chair Rail 5-1/4" X 15'	EA	6.30	340.20
6	18249	Roof Paper 50 sq. ft.	ROLL	16.47	98.82
39	18017	4 X 8 Gas Ply 1/4"	EA	18.24	711.36
			Purchase		1714.38
			Tax 7%		120.01
			Total		1834.39
			Pay Last Amount in this Column →		

UNIT TEST

DATA ENTRY

A. DEFINITIONS

Directions: Define data entry using complete sentences.

B. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents the answer in the space provided.

Column A

_____ 1. TV screen that displays information

_____ 2. Used to enter data directly into a computer

_____ 3. Small compartment which contains a program diskette while a program is in operation

_____ 4. Another name for a floppy disk

_____ 5. Machine with input and output capacity, a central processing unit, and memory

_____ 6. Item that contains the facts and figures for input

_____ 7. Device on a computer screen that indicates where the next character will appear

_____ 8. List of options (choices) from which the operator selects the action to be taken

_____ 9. Facts in the form of numbers, characters, or words

_____10. Data that goes into a computer

Column B

A. computer

B. cursor

C. data

D. disk drive

E. diskette

F. input

G. keyboard

H. menu

I. monitor

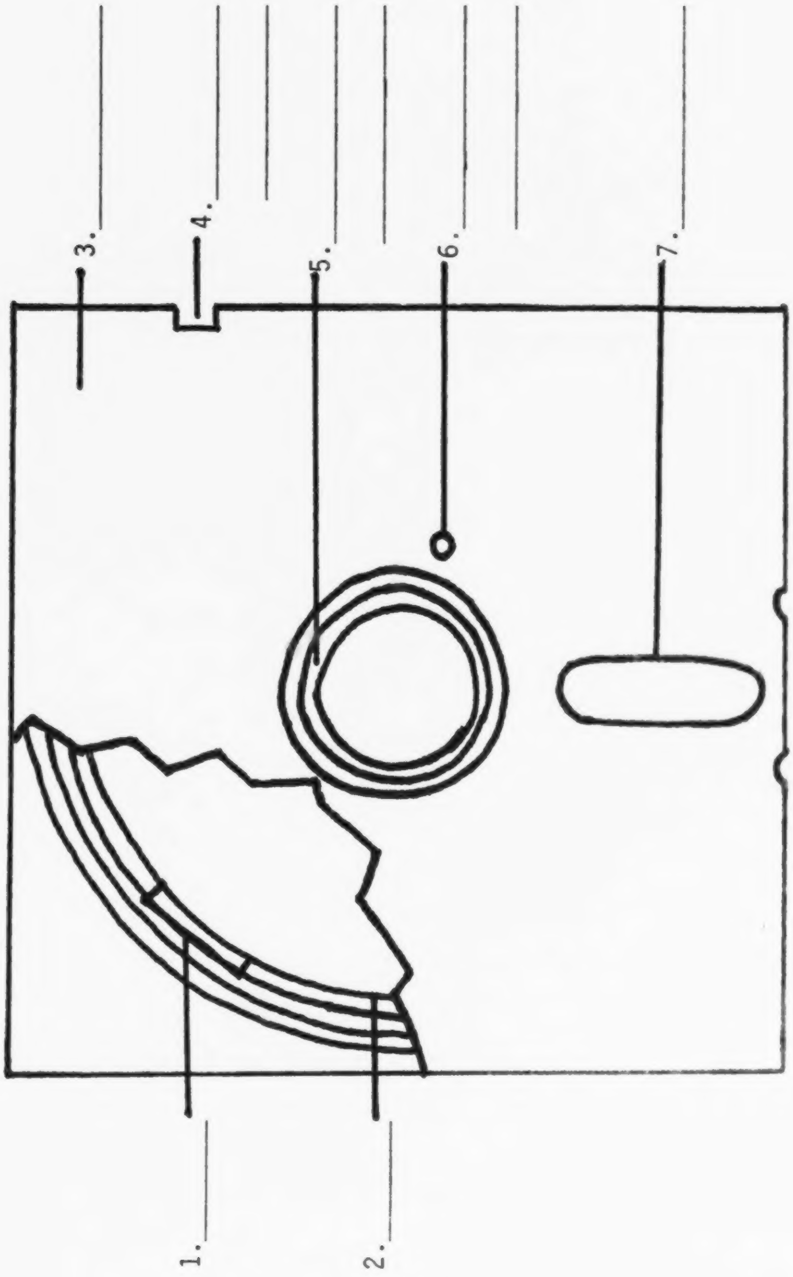
J. output

K. source document

UNIT TEST continued

C. DISKETTE COMPONENTS

Directions: Label the parts of the diskette.



UNIT TEST continued

D. LISTING AND ESSAY

Directions: Answer each item using complete sentences.

1. List and discuss three procedures for the proper care of a diskette.

2. List a main feature which makes each data entry device listed below different from other data entry devices.

   1. Keypunch -

   2. Key-to-tape device -

   3. Key-to-disk device -

   4. Microcomputer -

3. Identify an appropriate business application for each of the data entry devices listed below.

   1. on-line terminal -

   2. key-to-disk terminal -

   3. keypunch -

4. List and discuss three current trends in the entry of data.

UNIT TEST

ANSWER KEY

A. DEFINITIONS

Directions: Define data entry using complete sentences.

Data entry is the act of transcribing data into a form suitable for computer processing.

B. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents the answer in the space provided.

Column A

I 1. TV screen that displays information

G 2. Used to enter data directly into a computer

D 3. Small compartment which contains a program diskette while a program is in operation

E 4. Another name for a floppy disk

A 5. Machine with input and output capacity, a central processing unit, and memory

K 6. Item that contains the facts and figures for input

B 7. Device on a computer screen that indicates where the next character will appear

H 8. List of options (choices) from which the operator selects the action to be taken

C 9. Facts in the form of numbers, characters, or words

F 10. Data that goes into a computer

Column B

A. computer

B. cursor

C. data

D. disk drive

E. diskette

F. input

G. keyboard

H. menu

I. monitor

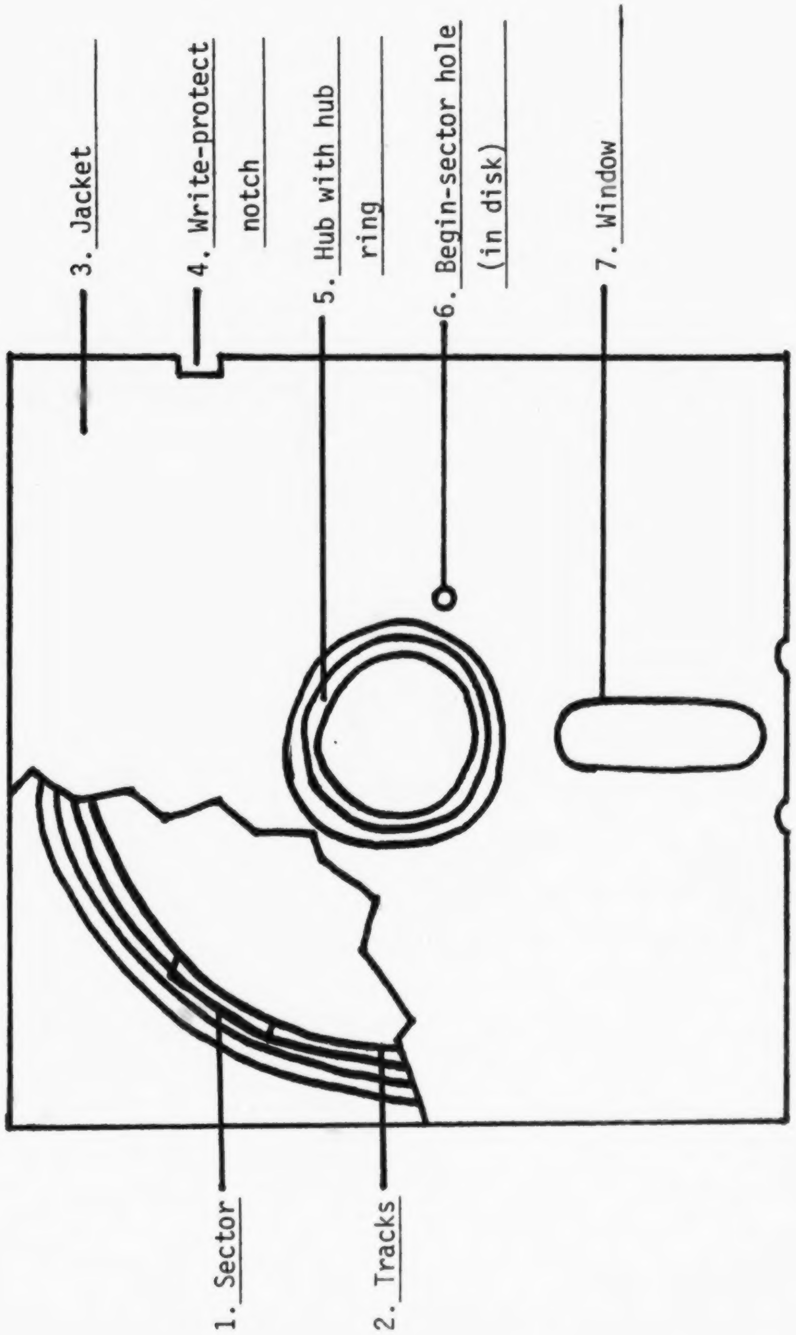
J. output

K. source document

UNIT TEST continued

C. DISKETTE COMPONENTS

Directions: Label the parts of the diskette.



3. Jacket
4. Write-protect notch
5. Hub with hub ring
6. Begin-sector hole (in disk)
7. Window
1. Sector
2. Tracks

D. LISTING AND ESSAY

Directions: Answer each item using complete sentences.

1. List and discuss three procedures for the proper care of a diskette.

   1. Keep away from extreme heat or cold. The programs and data stored can be damaged by extreme heat or cold.
   2. Keep away from magnetic fields. Data can become scrambled.
   3. Do not fold or bend the diskette. It may not load properly, and data may be damaged.

2. List a main feature which makes each data entry device listed below different from other data entry devices.

   1. Keypunch--This device is used to punch holes in punch cards to represent data.
   2. Key-to-tape device--This device is used to store data directly on magnetic tape.
   3. Key-to-disk device--This device is used to store data directly on magnetic disk. Data may later be transferred to tape for storage.
   4. Microcomputer--This device allows one to enter data for direct processing with no transfer of storage media.

3. Identify an appropriate business application for each of the data entry devices listed below.

   1. on-line terminal--Airline reservations are so complex that on-line terminals are required because of the speed requirements.
   2. key-to-disk terminal--Accounts payable information could be entered for later batch processing.
   3. keypunch--Keypunching could be used to record data about equipment inventory.

4. List and discuss three current trends in the entry of data.

   1. There is very little use of keypunch machines today. Other means of data entry are faster, and error correction is easier under other methods.
   2. Mailing lists are frequently stored on disk because of the easier updating procedures. Updating on disk is faster than on tape.
   3. Microcomputers are increasing in use. For many applications, direct entry of data for processing is important, and microcomputers provide this at relatively low cost.

EVALUATION AND TESTING

Ways to Evaluate Pupil Growth

- Class notebook
- Class participation
- Data entry proficiency test
- Microcomputer operation
- Source documents exercises
- Unit test
- Workbook/simulation activities

EQUIPMENT AND SUPPLIES

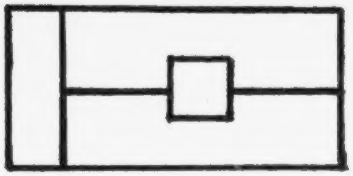
Student

Textbook
Notebook
Text-workbook
Operator's Manual
Practice Set/Simulation
Computer
Data Entry Device(s)

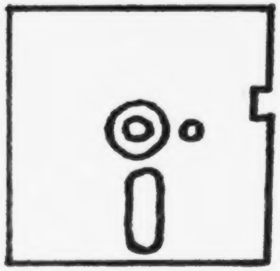
Teacher

Textbook and Manual
Bulletin Board Supplies
Operator's Manual
Practice Set Manual
Text-workbook and Key
Practice Sets
Computers
Data Entry Devices
Handouts

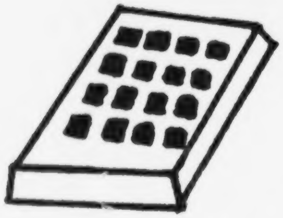
DATA ENTRY EQUIPMENT



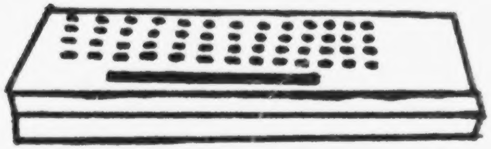
DISK DRIVE



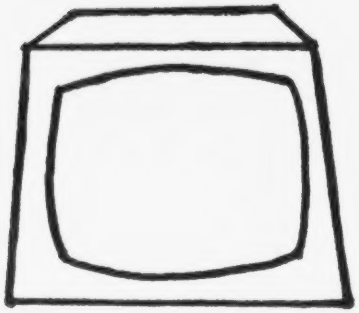
DISKETTE



NUMERIC KEY PAD

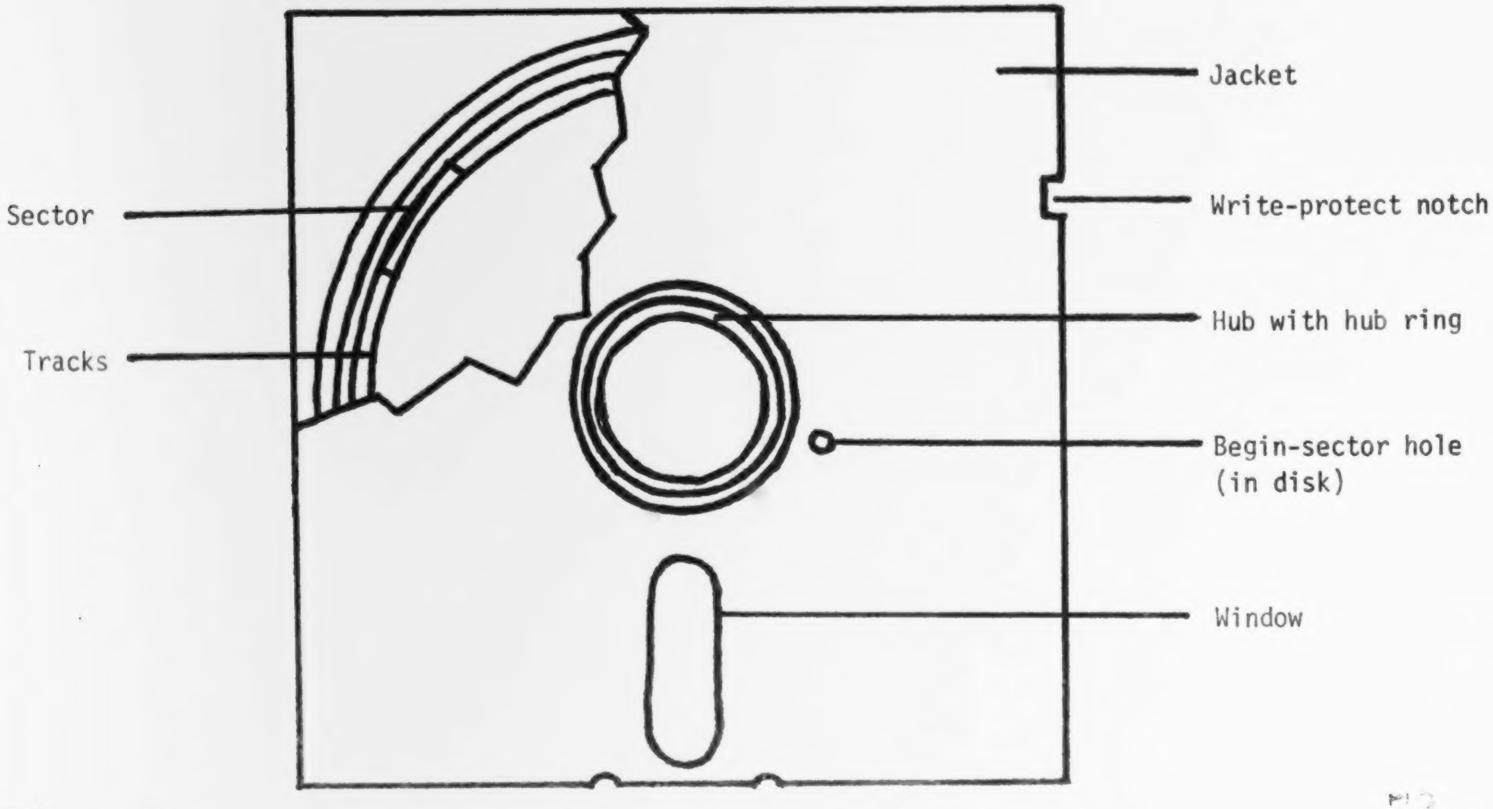


KEYBOARD



CRT

KNOW YOUR DISKETTE


Jacket
Sector
Write-protect notch
Hub with hub ring
Tracks
Begin-sector hole (in disk)
Window

SUPPLEMENTARY MATERIALS

Brochures

Diskette Care and Handling
Verbatim Corporation
Corporate Communication
323 Soquel Way
Sunnyvale, CA 94086

Diskette Terms and Technology
Verbatim Corporation
Corporate Communication
323 Soquel Way
Sunnyvale, CA 94086

Filmstrips

Computer Programming
(Getting acquainted with computers)
Bergwall Productions
P. O. Box 238
Garden City, NY 11530

About Computers
Electronic Specialist, Inc.
171 South Main Street
Natick, MA 01760

Computer Glossary
Howard W. Sams and Company, Inc.
4300 West 62nd Street
P. O. Box 7092
Indianapolis, IN 46206

Periodicals

The Computing Teacher
The International Council for Computers in Education
University of Oregon
1787 Agate Street
Eugene, OR 97403

Software News
The Magazine of Business Software Selection and Use
P. O. Box 5421
Winchester, MA 01890

SUPPLEMENTARY MATERIALS continued

T.H.E. Journal
Circulation Department
T.H.E. Journal
P. O. Box 15126
Santa Ana, CA 92705-0126

Simulations

Data Preparation/Entry Clerk. The Boss: Microcomputer Job Simulation Series.
(Available for Apple II, Apple IIe, and TRS-80 Model III)
(Diskette, student manual, forms, and teacher aids)
Career Aids, Inc.
20417 Nordhoff Street, Dept. U
Chatsworth, CA 91311

Lee, Helen. Data Entry Concepts and Exercises
John Wiley and Sons
605 Third Avenue
New York, NY 10158

Software

Bux and Clark. Data Entry Activities for the Microcomputer
(Available for TRS-80, Apple, and IBM PC) (Text and diskette)
South-Western Publishing Company, 1982
11310 Gemini Lane
Dallas, TX 75229

INPUT: Putting Data into Computers
(Apple, TRS-80 III disk)
QUEUE, Inc.
5 Chapel Hill Drive
Fairfield, CT 06432
800-232-2224

Introduction to the Microcomputer Keyboard
(Available for Apple II or IIe, 48K) (Disk and audio cassette)
Career Aids, Inc.
20417 Nordhoff Street, Dept. U
Chatsworth, CA 91311

Jackson and Schroeder. Microcomputer Keypad Operation
(Available for TRS-80 Model III and Model IV, Apple II Plus and Apple IIe, and IBM PC)
South-Western Publishing Company, 1984
11310 Gemini Lane
Dallas, TX 75229

SUPPLEMENTARY MATERIALS continued

Textbooks

Capron, H. L., and Brian K. Williams. Computers and Data Processing, 1984.
The Benjamin/Cummings Publishing Company
Division of Addison Wesley
Reading, MA 01867

Clark, James F., and Judith J. Lambrecht. Information Processing, 1985. Dallas:
South-Western Publishing Company
11310 Gemini Lane
Dallas, TX 75229

Daggett, Willard R., Kamiran S. Badrkhan, and Benedict Kruse. Computers and Information Technology, 1985
South-Western Publishing Company
11310 Gemini Lane
Dallas, TX 75229

Robichaud, Beryl, Eugene Muscat, and Alix-Marie Hall. Introduction to Data Processing, Third Edition, 1983.
Gregg Division/McGraw-Hill Book Company
P. O. Box 996
Norcross, GA 30091

Wood, Merle. Computer Awareness, 1982
South-Western Publishing Company
11310 Gemini Lane
Dallas, TX 75229

Transparencies

Data Processing
(Transparencies, duplicating masters, and teacher's guide)
South-Western Publishing Company
11310 Gemini Lane
Dallas, TX 75229

RESOURCES

Atkinson, June St. Clair. Help with Computer Literacy. Boston: Houghton Mifflin Company, 1984.

Bux, William E., and James F. Clark. Data Entry Activities. Cincinnati: South-Western Publishing Company, 1982.

Clark, James F., and Judith J. Lambrecht. Information Processing. Cincinnati: South-Western Publishing Company, 1985.

Mandell, Steven L. Computers and Data Processing. 3rd ed. St. Paul: West Publishing Company, 1985.

Robichaud, Beryl, Eugene Muscat, and Alix-Marie Hall. Introduction to Data Processing. New York: Gregg Division/McGraw-Hill Book Company, 1983.

Spencer, Donald D. Principles of Information Processing. Columbus, OH: Charles E. Merrill Publishing Company, 1985.

Stern, Robert A., and Nancy Stern. An Introduction to Computers and Information Processing. New York: John Wiley and Sons, 1985.

UNIT III

PROGRAMMING

INTRODUCTION

In order for students to achieve a degree of computer knowledge, an understanding of the concepts involved in computer programming is necessary.

Computers and their uses are affecting the lives of nearly everyone in some way. Many postsecondary schools have incorporated the understanding and use of computers in their curricula. In preparing secondary students for computer-related studies or work, an introduction to programming is important.

The purpose of this unit is to introduce students to the vocabulary of programming and to give students practice in designing simple programs.

COMPETENCIES

1. Demonstrate an understanding of programming vocabulary.
2. Structure and design programs for given business problems.

GENERAL PERFORMANCE OBJECTIVES/GOALS

1. Employ vocabulary terms related to programming.
2. Construct a flowchart for a given business problem.
3. Design a program for the given business problem.

SPECIFIC PERFORMANCE OBJECTIVES AND MASTERY CRITERIA

1. Students will be able to spell programming terms on a teacher-dictated, written test with at least 75 percent accuracy.
2. Students will be able to match programming and flowcharting terms with their definitions and/or symbols on a written test with at least 75 percent accuracy.

3. Given a business programming problem students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent the REM, PRINT, GOTO, and END statements with at least 75 percent accuracy.

4. Using a completed flowchart, students will be able with at least 75 percent accuracy to code and debug the program for the problem using the REM, PRINT, GOTO, and END statements.

5. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent the LET and INPUT statements with at least 75 percent accuracy.

6. Using a completed flowchart, students will be able with at least 75 percent accuracy to code and debug the program for the problem using the LET and INPUT statements.

7. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent the FOR/NEXT statements with at least 75 percent accuracy.

8. Using a completed flowchart, students will be able with at least 75 percent accuracy to code and debug the program for the problem using the FOR/NEXT statements.

9. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent the READ/DATA statements with at least 75 percent accuracy.

10. Using a completed flowchart, students will be able with at least 75 percent accuracy to code and debug the program for the problem using the READ/DATA statements.

11. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent the IF/THEN statements with at least 75 percent accuracy.

12. Using a completed flowchart, students will be able with at least 75 percent accuracy to code and debug the program for the problem using the IF/THEN statement.

13. Given a problem on a written test, students will be able to construct a flowchart and write the BASIC code to solve the problem with at least 75 percent accuracy.

METHODOLOGY

The purpose of this unit is to introduce programming terminology and to develop programming skills. Activities will be provided to explain the definitions of terms and to allow practice using these terms. Practice problems of a business nature will be provided for students to gain experience in structuring and designing flowcharts and programs.

Books, practice sets, and periodicals are listed in the supplementary materials section of this unit for further reference in developing this unit.

SUGGESTED INTEREST APPROACHES

1. Invite an instructor from a local technical school or college to discuss postsecondary education in programming.
2. Invite a business person who is involved in programming to talk about his/her job description.
3. View a film that explains programming and uses programming terminology.
4. Establish a programming contest between classes and award computer-related posters for different aspects of good programming techniques.
5. Establish a programming club for all interested students in the school.
6. Have students find programming jobs in newspapers and discuss requirements, hours, salaries, etc.
7. Have students construct crossword or find-a-word puzzles using programming terms.
8. Take a field trip to a local business that has a programming department.
9. Have students prepare a bulletin board showing a flowchart and the resulting program.

UNIT OUTLINE

PROGRAMMING

- I. Programming Vocabulary
  - A. Flowcharting terms
  - B. Programming terms
- II. Flowchart Preparation
  - A. Flowchart symbols
    - 1. terminal
    - 2. input/output
    - 3. processing
    - 4. decision
    - 5. connector
    - 6. offpage connector
    - 7. flow direction arrow
  - B. Steps in a flowchart problem
  - C. Construction of a flowchart
- III. Program Development
  - A. Comparison of flowchart symbols with BASIC statements
  - B. Program coding in BASIC
    - 1. REM
    - 2. PRINT
    - 3. GOTO
    - 4. END
    - 5. LET
    - 6. INPUT
    - 7. FOR/NEXT
    - 8. READ/DATA
    - 9. IF/THEN
  - C. System commands
    - 1. NEW
    - 2. LIST
    - 3. RUN
  - D. Program code entry
  - E. Program debugging

SPECIFIC PERFORMANCE OBJECTIVES AND LEARNING ACTIVITIES

1. Students will be able to spell programming terms on a teacher-dictated, written test with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Programming Vocabulary	1. Define a list of vocabulary words using textbooks or computer dictionaries. (Appendix A) 2. Check accuracy of definitions during oral discussion. 3. Participate in a spelling bee of programming and flowcharting terms. 4. Write dictated words. (Refer to Vocabulary List, Appendix A.)

2. Students will be able to match programming and flowcharting terms with their definitions and/or symbols on a written test with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Programming Vocabulary	1. Fill in a crossword puzzle using the vocabulary list. (Appendix B) 2. Correct the puzzle during class discussion. 3. Match words to definitions by completing a vocabulary review quiz. 4. Write sentences using the terms in the vocabulary list.

---

3. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent the REM, PRINT, GOTO, and END statements with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Flowchart Preparation	1. Observe and discuss flowcharting symbols on a prepared bulletin board. (Refer to Flowcharting Bulletin Board.)
	2. Observe and discuss examples of infinite loops and how to break out of one.
	3 View the designing of a flowchart from a problem requiring the REM, PRINT, GOTO, and END statements.
	4. Construct a flowchart for a business problem using the REM, PRINT, GOTO, and END statements. (Appendix C, Step 1)

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4. Using a completed flowchart, students will be able with at least 75 percent accuracy to code and debug the program for the problem using the REM, PRINT, GOTO, and END statements.

Subject Matter Content	Learning Activities
Program Coding and System Commands in BASIC REM PRINT GOTO END NEW LIST RUN	1. View a transparency on the relationship between the flowchart steps and the lines in program.
	2. Use the previously constructed flowchart to code the steps of a business problem. (Appendix C, Step 2)
	3. Key the program into the computer.

4. Debug and rekey the program into the computer. The program and its output will be corrected to 100 percent accuracy.
5. Organize necessary documentation, including the flowchart, the coded program, and a copy of the output.

---

5. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent the LET and INPUT statements with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Flowchart Preparation	1. View the flowcharting bulletin board. 2. View transparencies on problems using LET and INPUT statements and the resulting flowcharts. 3. Complete and check a worksheet which requires construction of a flowchart using LET and INPUT statements. (Appendix D, Step 1) 4. View a problem on the board which combines new and previously learned symbols and statements.

---

6. Using a completed flowchart, students will be able with at least 75 percent accuracy to code and debug the program for the problem using the LET and INPUT statements.

Subject Matter Content	Learning Activities
Program Coding and System Commands in BASIC LET INPUT NEW LIST RUN	1. Discuss the use of the clearscreen function. 2. View transparencies of a problem using the LET and INPUT statements and the resulting flowcharts. 3. Use the previously constructed flowchart to code the steps of a business problem. (Appendix D, Step 2)

4. Key the program into the computer.
5. Debug and rekey the program. The program and its output will be corrected to 100 percent accuracy.
6. Organize necessary documentation, including the flowchart, the coded program, and a copy of the output.

---

7. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent the FOR/NEXT statements with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Flowchart Preparation	1. View problems on the board using the FOR/NEXT statements and the resulting flowcharts. 2. Complete and check a worksheet which requires construction of a flowchart for a problem using a FOR/NEXT loop. (Appendix E, Step 1) 3. View a problem on the board which combines new and previously learned symbols and statements.

---

8. Using a completed flowchart, students will be able with at least 75 percent accuracy to code and debug the program for the problem using the FOR/NEXT statements.

Subject Matter Content	Learning Activities
Program coding in BASIC FOR/NEXT	1. View on the board a problem using the FOR/NEXT statements and the resulting flowchart. 2. Use the previously constructed flowchart to code the steps of a business problem. (Appendix E, Step 2) 3. Key the program into the computer.

4. Debug and rekey the program. Program and its output will be corrected to 100 percent accuracy.

5. Organize necessary documentation, including the flowchart, the coded program, and a copy of the output.

---

9. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent the READ/DATA statements with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Flowchart Preparation	1. View transparencies on problems using the READ/DATA statement and the resulting flowcharts. 2. View transparencies of problems using READ/DATA statements which result in "out of data" errors. 3. Complete and check a worksheet which requires construction of a flowchart for a problem using the READ/DATA statements. (Appendix F, Step 2) 4. View a problem on the board that combines the new and previously learned symbols and statements.

---

10. Using a completed flowchart, students will be able with at least 75 percent accuracy to code and debug the program for the problem using the READ/DATA statement.

Subject Matter Content	Learning Activities
Program coding inin BASIC READ/DATA	1. View a transparency of a problem using the READ/DATA statements and the resulting flowchart. 2. Use the previously constructed flowchart to code the steps of a business problem. (Appendix F, Step 2)

3. Construct a flowchart and program for a problem using the READ/DATA statements.
4. Key the program into the computer.
5. Debug and rekey the program. The program and its output will be corrected to 100 percent accuracy.
6. Organize necessary documentation, including the flowchart, the coded program, and the output.

---

11. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent the IF/THEN statement with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Flowchart Preparation	1. View on the board examples of relational operators.
	2. View on the board problems using IF/THEN statements and the resulting flowcharts.
	3. Complete and check a worksheet which requires construction of a flowchart using IF/THEN statements. (Appendix G, Step 1)

---

12. Using a completed flowchart, students will be able with at least 75 percent accuracy to code and debug the program for the problem using the IF/THEN statement.

Subject Matter Content	Learning Activities
Program coding in BASIC IF/THEN	1. View on the board a problem using the IF/THEN statement and the resulting flowchart.
	2. Use the previously constructed flowchart to code the steps of a business problem. (Appendix G, Step 2)

3. Key the program into the computer.
4. Debug and rekey the program. Program and its output will be corrected to 100 percent accuracy.
5. Organize necessary documentation, including the flowchart, the coded program, and the output.

---

13. Given a problem on a written test, students will be able to construct a flowchart and write the BASIC code to solve the problem with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Construction of a flowchart Program coding in BASIC	1. Construct a flowchart and write the BASIC code to calculate a bowler's average score for the three games bowled.
	2. Construct a flowchart and write the BASIC code to calculate gross pay for three workers who have each worked 40 hours during the pay period.
	3. Construct a flowchart and write the BASIC code to convert miles to kilometers for the following distances: 1 mile, 2 miles, 3 miles, 4 miles, and 5 miles.

APPENDIX A

VOCABULARY LIST

Directions

Define the following words using textbooks and computer dictionaries. Be sure to learn to spell these terms as you are defining them.

1. BASIC
2. COBOL
3. PASCAL
4. FORTRAN
5. program
6. programming
7. programmer
8. software
9. hardware
10. flowchart
11. template
12. statement
13. REM statement
14. PRINT statement
15. GOTO statement
16. END statement
17. LET statement
18. INPUT statement
19. FOR/NEXT statement
20. READ/DATA statement
21. IF/THEN statement
22. line numbers
23. terminal symbol
24. input/output symbol
25. processing symbol
26. decision symbol
27. connector symbol
28. offpage connector
29. flow direction arrow
30. debug
31. documentation
32. syntax
33. error code
34. relational operators
35. infinite loop
36. RUN command
37. LIST command
38. NEW command
39. output
40. code

APPENDIX B

CROSSWORD PUZZLE CLUES

ACROSS

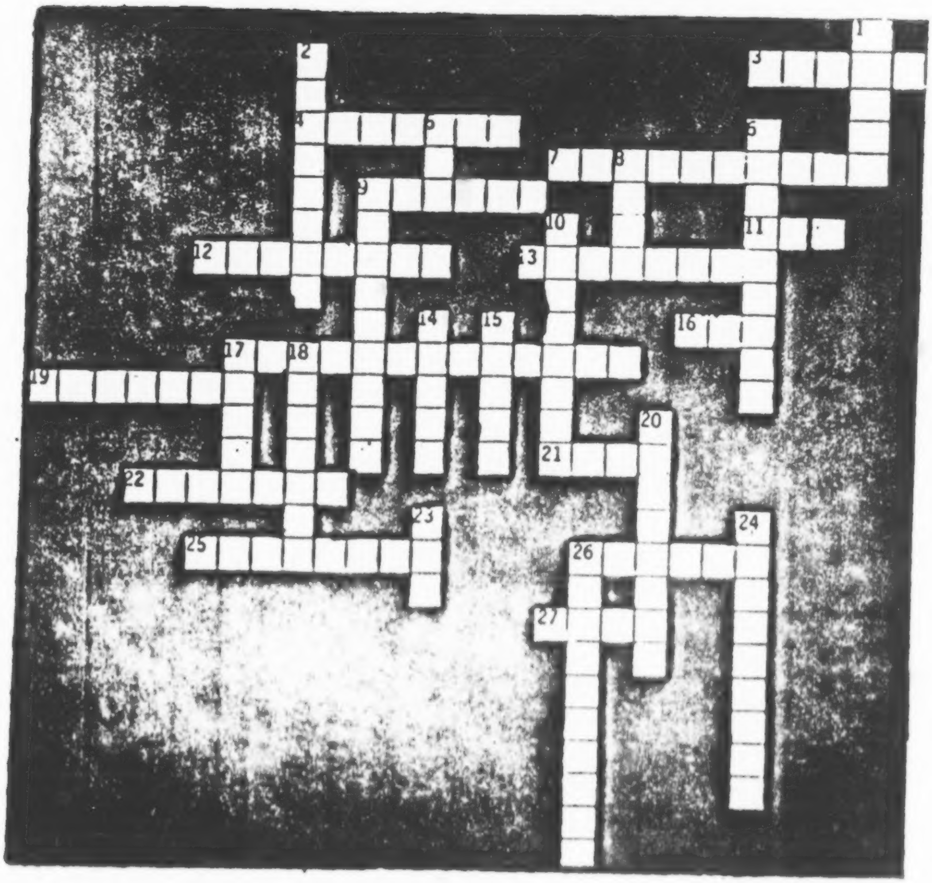
3. Message on the computer screen that shows a mistake has been made
4. Computer language used for math applications
7. BASIC symbols used to perform comparing operations
9. Structure of code within a program
11. Command that clears the computer's memory
12. Name for computer programs
13. Card that contains flowchart symbols
16. BASIC statement used to assign values to variables
17. Recorded facts regarding a program
19. Shows exit from or entry to another page
21. Numbers placed in front of statements
22. Series of instructions that directs a computer in performing a specific task
25. Physical equipment of a computer system
26. Computer language that is well suited for structured programming
27. BASIC statement that sends program control to a different line

DOWN

1. Computer language used for business applications
2. Never-ending loop
5. Command that instructs the computer to begin execution of a program
6. Connects separated portions of a flowchart without drawing lines between the parts
8. Causes execution of statements to be repeated
9. Single BASIC instruction
10. Symbol used to start and stop a flowchart
14. BASIC statement that causes a question mark on the screen and allows an answer to be typed
15. Beginner's All-Purpose Symbolic Instruction Code
17. Task of finding and eliminating mistakes in a program
18. Examples are RUN, LIST, and NEW
20. Represents a decision, question, or comparison that determines which paths are to be followed
23. BASIC statement that allows comments to be placed in a program
24. Graphic representation of order of operations in a data processing system
26. Flowchart symbol that represents calculations or other changes made to data

APPENDIX B

CROSSWORD PUZZLE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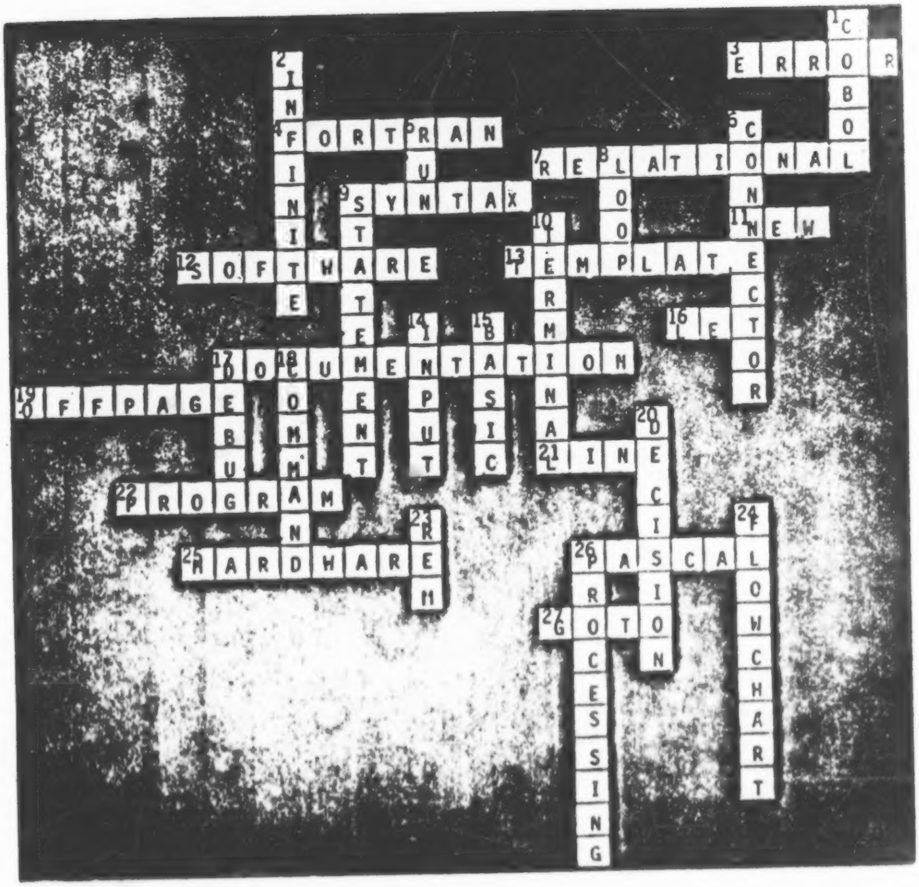
APPENDIX B

ANSWER KEY


1 COBOL
2 INFINITE
3 ERROR
4 FORTRAN
5 RUN
6 CONNECTOR
7 RELATIONAL
8 LOOP
9 SYNTAX
9 STATEMENT
10 TERMINAL
11 NEW
12 SOFTWARE
13 TEMPLATE
14 INPUT
15 BASIC
16 LET
17 DOCUMENTATION
17 DEBUG
18 COMMAND
19 OFFPAGE
20 DECISION
21 LINE
22 PROGRAM
23 REM
24 FLOWCHART
25 HARDWARE
26 PASCAL
26 PROCESSING
27 GOTO

APPENDIX C

WORKSHEET I

Directions

1. Construct a flowchart to show the steps in a program that would repeatedly print your name, your street address, your city, state, and zip code. (mailing labels)

   Example Output:

   ```
   John Doe
   6 Park Avenue
   New York, NY 97501

   John Doe
   6 Park Avenue
   New York, NY 97501

   .
   .
   .
   .
   ```

2. Based on the completed flowchart, code a BASIC program that provides the required output.

APPENDIX C

WORKSHEET I

Directions

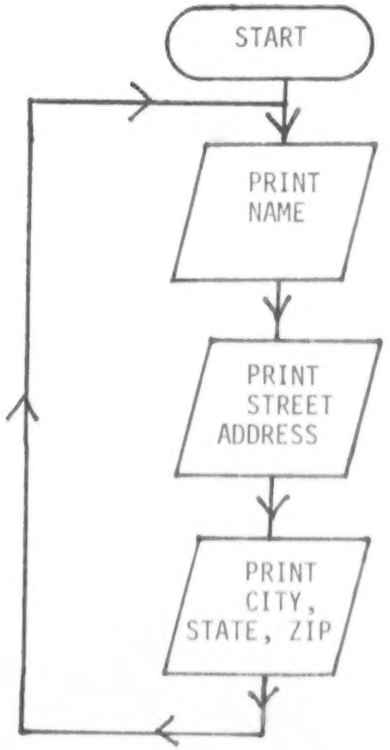
1. Construct a flowchart to show the steps in a program that would repeatedly print your name, your street address, your city, state, and zip code. (mailing labels)

Example Output:

```
John Doe
6 Park Avenue
New York, NY 97501

John Doe
6 Park Avenue
New York, NY 97501

.
.
.
.
```


START
PRINT NAME
PRINT STREET ADDRESS
PRINT CITY, STATE, ZIP

APPENDIX C

ANSWER KEY

2. Based on the completed flowchart, code a BASIC program that provides the required output.

   *Program could look like this:

```
100 REM mailing label for
110 REM name, street address,
120 REM city, state, zip code
130 PRINT "John Doe"
140 PRINT "6 Park Avenue"
150 PRINT "New York, NY 97501"
160 PRINT
170 REM 180 causes infinite loop
180 GOTO 130
```

APPENDIX D

WORKSHEET 2

Directions

1. Construct a flowchart for a program that will compute simple interest on a loan. Input your principal, rate, and time.

Sample Output:	Formula:
Interest = $420	I = Principal * Rate * Time

2. Based on the completed flowchart, code a BASIC program that provides the required output.

APPENDIX D

ANSWER KEY

Directions

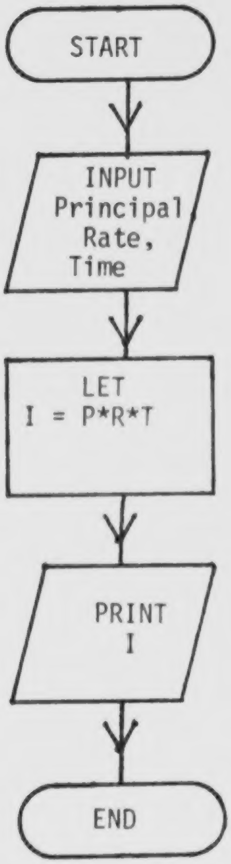
1. Construct a flowchart for a program that will compute simple interest on a loan. Input your principal, rate, and time.

Sample Output:

Interest = $420

Formula:

I = Principal * Rate * Time


START
INPUT Principal, Rate, Time
LET I = P*R*T
PRINT I
END

APPENDIX D

ANSWER KEY

2. Based on the completed flowchart, code a BASIC program that provides the required output.

   *Program could look like this:

```
10 REM simple interest
20 INPUT P, R, T
30 LET I = P * R * T
40 PRINT "Interest = $"; I
50 END
```

APPENDIX E

WORKSHEET 3

Directions

1. Construct a flowchart for a program that would cause the numbers 1 through 10 to print on the screen.

   Example Output: 1 2 3 4 5 6 7 8 9 10

2. Based on the completed flowchart, code a BASIC program that provides the required output.

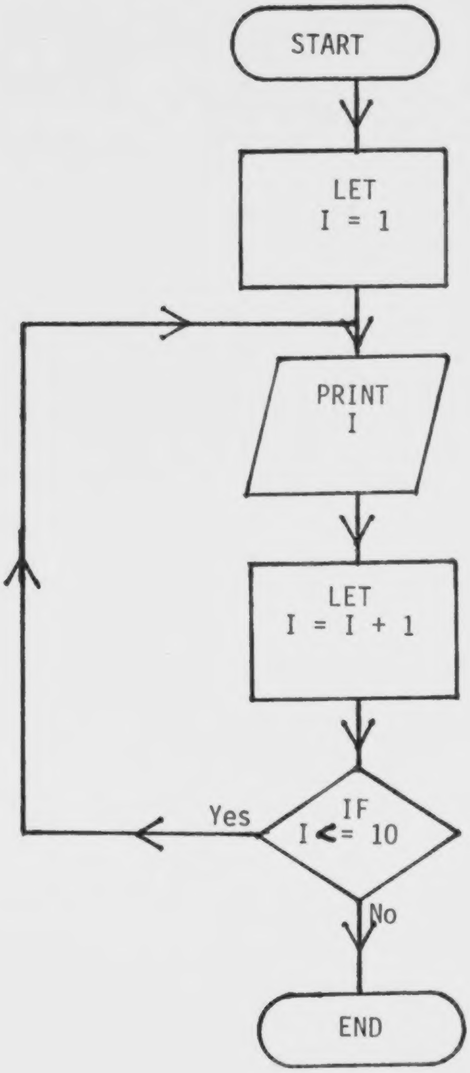
APPENDIX E

ANSWER KEY

Directions

1. Construct a flowchart for a program that would cause the numbers 1 through 10 to print on the screen.

   Example Output: 1 2 3 4 5 6 7 8 9 10


START
LET
I = 1
PRINT
I
LET
I = I + 1
IF
I <= 10
Yes
No
END

APPENDIX E

ANSWER KEY

2. Based on the completed flowchart, code a BASIC program that provides the required output.

   *Program could look like this:

```
10 REM Print Numbers
20 REM 1 through 10
30 FOR I = 1 to 10
40 PRINT I;
50 NEXT I
60 END
```

APPENDIX F

WORKSHEET 4

Directions: Given the list price of an item and the rate of discount, print the amount of discount and the net price.

1. Construct the flowchart for the problem above.

   Output:

   ```
   1.92      30.08
   2.94      39.06
   ```

   Formula:

   amount = list*rate
   net = list - amount

   List prices and rates:

   32.00, .06 and 42.00, .07

2. Based on the completed flowchart, code a BASIC program that provides the required output.

APPENDIX F

ANSWER KEY

Directions: Given the list price of an item and the rate of discount, print the amount of discount and the net price.

1. Construct the flowchart for the problem above.

Output:

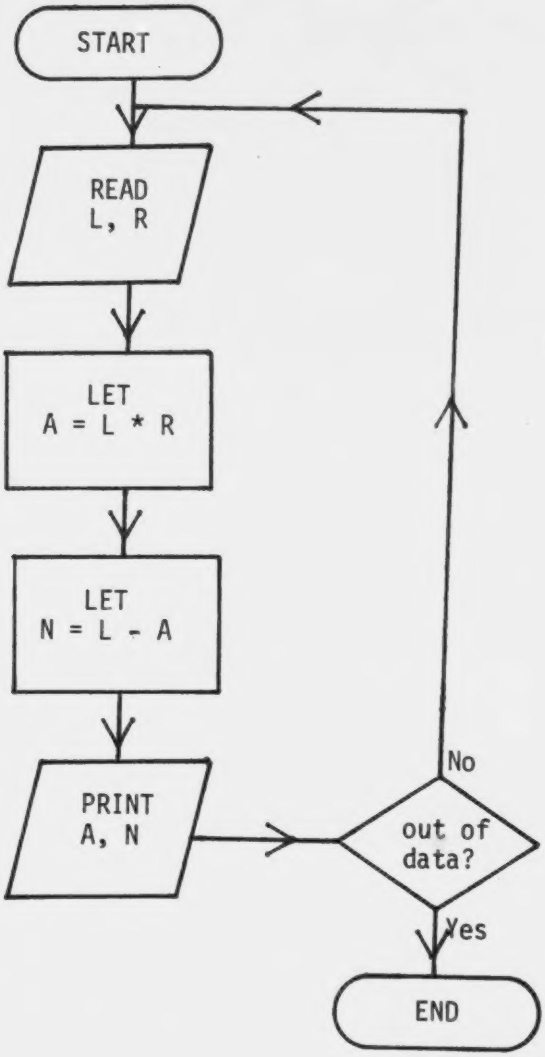
```
1.92     30.08
2.94     39.06
```

Formula:

amount = list*rate
net = list - amount

List prices and rates:

32.00, .06 and 42.00, .07


START
READ
L, R
LET
A = L * R
LET
N = L - A
PRINT
A, N
out of
data?
No
Yes
END

APPENDIX F

ANSWER KEY

2. Based on the completed flowchart, code a BASIC program that provides the required output.

*PROGRAM could look like this:

```
10 REM L is the list price
20 REM R is the rate
30 READ L, R
40 LET A = L*R
50 LET N = L - A
60 PRINT A, N
70 GOTO 30
80 DATA 32.00, .06, 42.00, .07
90 END
```

*Note: This program would result in an "out of data" message.

APPENDIX G

WORKSHEET 5

Directions: The cost of sending a telegram from New Orleans to Baton Rouge is $4.20 for the first 15 or fewer words, plus 11 cents for each additional word over 15.

1. Construct a flowchart for a program that would read the number of words and compute the cost.

   Sample Output:

   ```
   Cost is $4.20
   Cost is $5.30
   Cost is $5.85
   ```

   Formula:

   $C = 4.20 + .11 * (W - 15)$

   Number of Words:

   14, 25, 30, -999

2. Based on the completed flowchart, code a BASIC program that provides the required output.

APPENDIX G

ANSWER KEY

Directions: The cost of sending a telegram from New Orleans to Baton Rouge is $4.20 for the first 15 or fewer words, plus 11 cents for each additional word over 15.

1. Construct a flowchart and program that would read the number of words and compute the cost.

   Sample Output:

   ```
   Cost is $4.20
   Cost is $5.30
   Cost is $5.85
   ```

   Formula:

   C = 4.20 + .11 * (W - 15)

   Number of Words:

   14, 25, 30, -999

   FLOWCHART:

   On next page

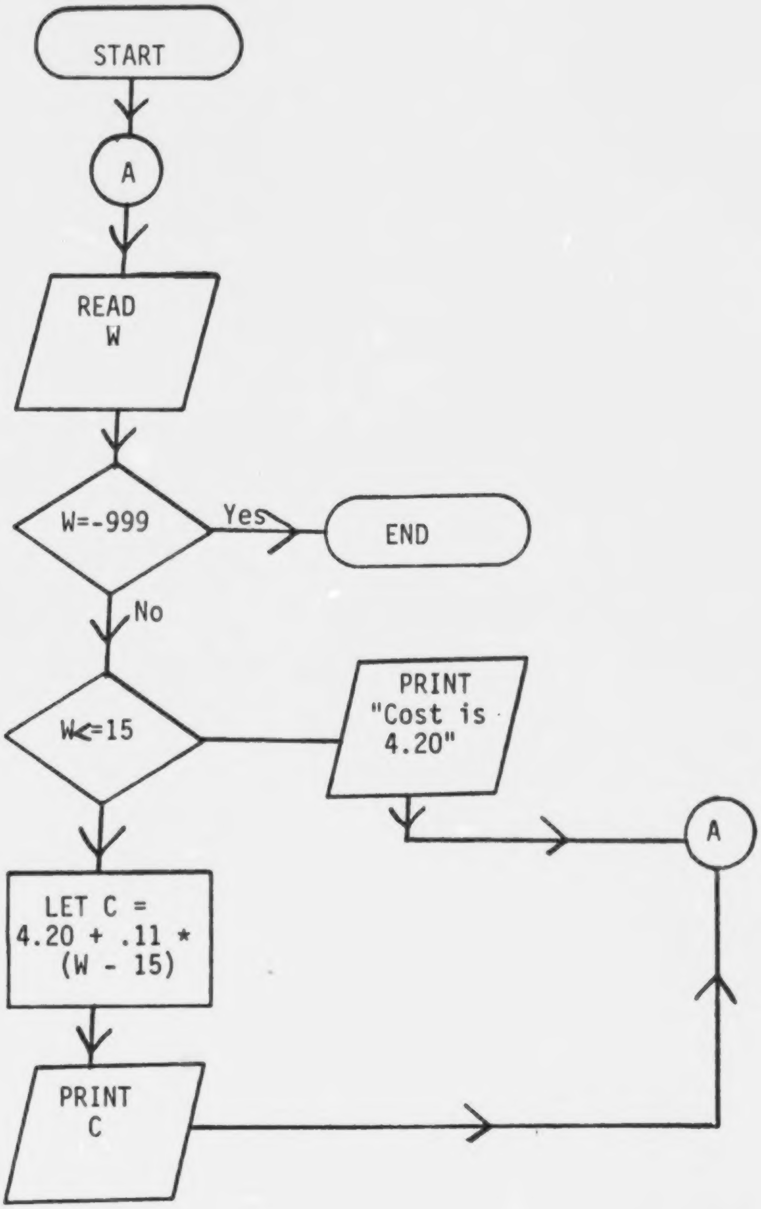
2. Based on the completed flowchart, code a BASIC program that provides the required output.

   *Program could look like this:

```
10 REM program to figure cost of 3 telegrams
20 READ W
30 IF W = -999 THEN 110
40 IF W <= 15 THEN 80
50 LET C = 4.20 + .11 * (W - 15)
60 PRINT "Cost is $"; C
70 GOTO 20
80 PRINT "Cost is $4.20"
90 GOTO 20
100 DATA 14, 25, 30, -999
110 END
```

APPENDIX G

Flowchart:


START
A
READ W
W=-999
Yes
END
No
W<=15
PRINT "Cost is 4.20"
A
LET C = 4.20 + .11 * (W - 15)
PRINT C

UNIT TEST

PROGRAMMING

A. SPELLING

Directions: Spell the following words from dictation:

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________
6. ____________________
7. ____________________
8. ____________________
9. ____________________
10. ____________________

B. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents your answer in the space next to each question.

Column A

_____ 1. Computer language used extensively in personal computing

_____ 2. Series of instructions that directs a computer in performing a specific task

_____ 3. Computer programs; the coded instructions that direct the operation of computer hardware

_____ 4. Physical equipment of a computer system

_____ 5. Graphic representation of order of operations in data processing system

_____ 6. Plastic or metallic card containing flowcharting symbols

_____ 7. Single BASIC instruction

_____ 8. Statement that allows the programmer to insert remarks or comments throughout the program without interrupting the operation of the computer

_____ 9. BASIC statement that causes the computer to produce human readable output

_____ 10. Statement in a BASIC program that indicates termination of the program

Column B

A. BASIC
B. code
C. connector symbol
D. debug
E. decision symbol
F. documentation
G. END
H. flowchart
I. FOR/NEXT statements
J. hardware
K. INPUT statement
L. INPUT/OUTPUT symbol
M. LET statement
N. LIST command
O. NEW command
P. PRINT
Q. processing symbol
R. program
S. READ/DATA statements
T. REM
U. RUN command

UNIT TEST continued

_____ 11. Represents an input or output operation

_____ 12. Represents calculations or other changes to data

_____ 13. Represents a decision, question, or comparison that determines which paths are to be followed

_____ 14. Connects separated portions of flowchart without drawing lines between the parts

_____ 15. To detect, locate, and eliminate mistakes or errors in a program

_____ 16. BASIC statement in which the value shown on the right-hand side of the equal sign is stored in the name given on the left-hand side

_____ 17. BASIC statement which allows the operator to enter data values at the terminal during the execution of the program

_____ 18. BASIC statements that direct the computer to repeat a set of instructions a specified number of times before control is transferred to the statements following the loop

_____ 19. BASIC statements that work as a team to store and assign data within a program

_____ 20. Recorded facts regarding a program

_____ 21. System command tnat directs the computer to execute the source program

_____ 22. System command used to display program lines on a terminal

V. software

W. statement

X. template

Y. terminal symbol

_____ 23. Command that clears out the workspace in a computer's memory and allows the programmer to name the workspace

_____ 24. To translate and write information in a programming language

_____ 25. Symbol that represents the beginning or ending of a program

C. MATCHING

Directions: Using the list in Column B, select the symbol that corresponds to each statement and write the letter that represents your answer in the space next to each statement.

_____ 1. Flow direction

_____ 2. Processing symbol

_____ 3. Terminal symbol

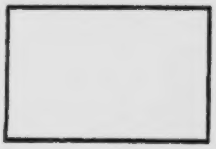
_____ 4. Decision symbol

_____ 5. INPUT/OUTPUT symbol

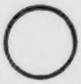
_____ 6. Connector symbol

_____ 7. Offpage connector

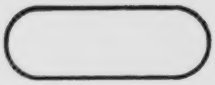
A.



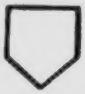
B.



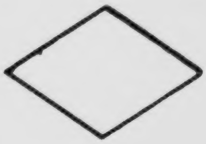
C.



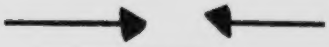
D.



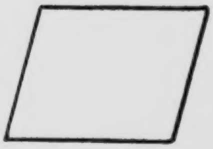
E.



F.



G.



UNIT TEST continued

D. FLOWCHART AND PROGRAM

Directions: Construct a flowchart and a program that would add five grades and calculate the average.

Variables to be used:	N = number S = sum A = average
Grades to be used:	93, 96, 72, 83, 51, -999
Statements to be used:	REM, READ/DATA, IF/THEN, LET, GOTO, PRINT, END

UNIT TEST

ANSWER KEY

A. SPELLING

Directions: Spell the following words from dictation:

1. template
2. debug
3. programmer
4. connector symbol
5. documentation
6. BASIC
7. terminal symbol
8. flowchart
9. COBOL
10. software

*Spelling Test should be taken and handed in before Matching Test is given.

UNIT TEST continued

B. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents your answer in the space next to each question.

Column A

A 1. Computer language used extensively in personal computing

R 2. Series of instructions that directs a computer in performing a specific task

V 3. Computer programs; the coded instructions that direct the operation of computer hardware

J 4. Physical equipment of a computer system

H 5. Graphic representation of order of operations in data processing system

X 6. Plastic or metallic card containing flowcharting symbols

W 7. Single BASIC instruction

T 8. Statement that allows the programmer to insert remarks or comments throughout the program without interrupting the operation of the computer

P 9. BASIC statement that causes the computer to produce human readable output

G 10. Statement in a BASIC program that indicates termination of the program

Column B

A. BASIC
B. code
C. connector symbol
D. debug
E. decision symbol
F. documentation
G. END
H. flowchart
I. FOR/NEXT statements
J. hardware
K. INPUT statement
L. INPUT/OUTPUT symbol
M. LET statement
N. LIST command
O. NEW command
P. PRINT
Q. processing symbol
R. program
S. READ/DATA statements
T. REM
U. RUN command

UNIT TEST continued

L 11. Represents an input or output operation

Q 12. Represents calculations or other changes to data

E 13. Represents a decision, question, or comparison that determines which paths are to be followed

C 14. Connects separated portions of flowchart without drawing lines between the parts

D 15. To detect, locate, and eliminate mistakes or errors in a program

M 16. BASIC statement in which the value shown on the right-hand side of the equal sign is stored in the name given on the left-hand side

K 17. BASIC statement which allows the operator to enter data values at the terminal during the execution of the program

I 18. BASIC statements that direct the computer to repeat a set of instructions a specified number of times before control is transferred to the statements following the loop

S 19. BASIC statements that work as a team to store and assign data within a program

F 20. Recorded facts regarding a program

U 21. System command that directs the computer to execute the source program

N 22. System command used to display program lines on a terminal

V. software

W. statement

X. template

Y. terminal symbol

UNIT TEST continued

O 23. Command that clears out the workspace in a computer's memory and allows the programmer to name the workspace

B 24. To translate and write information in a programming language

Y 25. Symbol that represents the beginning or ending of a program

C. MATCHING

Directions: Using the list in Column B, select the symbol that corresponds to each statement and write the letter that represents your answer in the space next to each statement.

F 1. Flow direction

A 2. Processing symbol

C 3. Terminal symbol

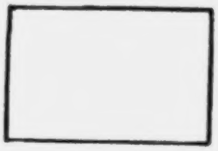
E 4. Decision symbol

G 5. INPUT/OUTPUT symbol

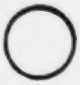
B 6. Connector symbol

D 7. Offpage connector

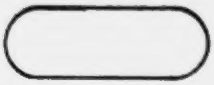
A.



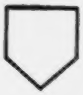
B.



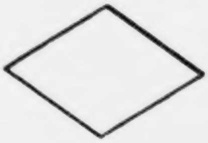
C.



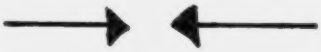
D.



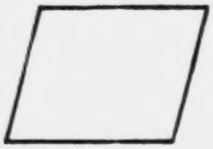
E.



F.



G.



D. FLOWCHART AND PROGRAM

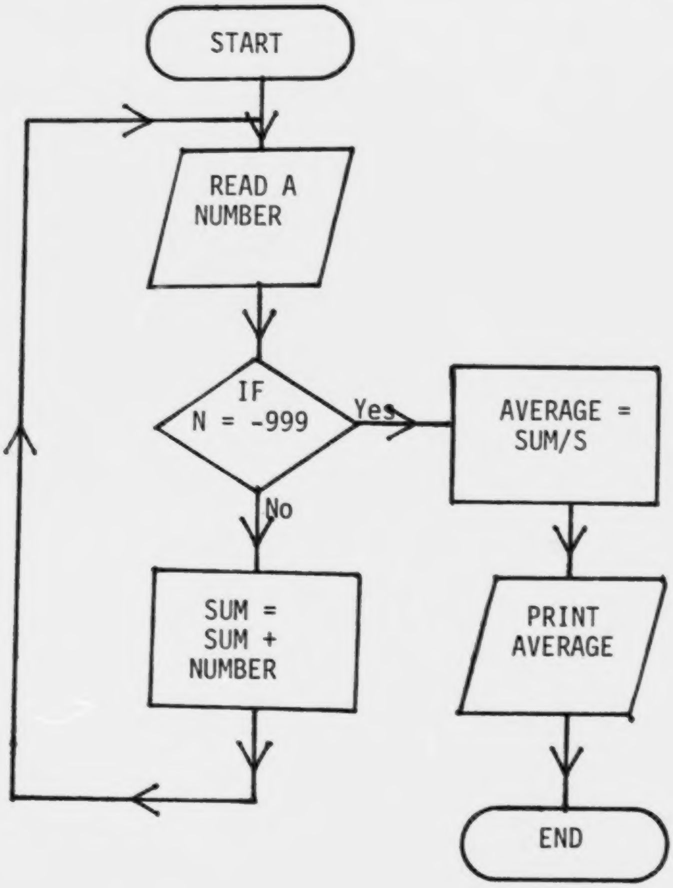
Directions: Construct a flowchart and a program that would add five grades and calculate the average.

Variables to be used:
N = number
S = sum
A = average

Grades to be used: 93, 96, 72, 83, 51, -999

Statements to be used: REM, READ/DATA, IF/THEN, LET, GOTO, PRINT, END

FLOWCHART:


START
READ A NUMBER
IF N = -999
Yes
No
AVERAGE = SUM/S
SUM = SUM + NUMBER
PRINT AVERAGE
END

PROGRAM:

```
 10 REM This program reads 5 numbers, finds the sum and the average.
 20 REM              N = number
 30 REM              S = sum
 40 REM              A = average
 50 READ N
 60 IF N = -999 THEN 90
 70 LET S = S + N
 80 GOTO 50
 90 LET A = S/5
100 PRINT "The average is   ";A
110 DATA 93, 96, 72, 83, 51, -999
999 END
```

*Students' flowcharts and programs may differ slightly from Answer Key.

EVALUATION AND TESTING

Ways to Evaluate Pupil Growth

- Crossword puzzle
- Class notebook
- Flowcharts
- Programs
- Unit test

EQUIPMENT AND SUPPLIES

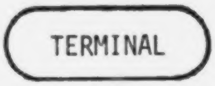
Student

Textbook
Notebook
Worksheets
Computer Dictionary
Template
Pencil or Pen
Eraser
Computers

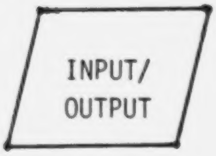
Teacher

Textbook and Manual
Operator's Manual
Worksheets
Computer Dictionary
Template
Computers
Bulletin Board Supplies
Construction Paper
Bulletin Board Letters

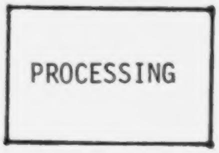
FLOWCHART SYMBOLS



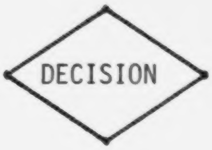
BEGIN OR END


INPUT/
OUTPUT

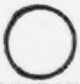
IN OR OUT OF STORAGE


PROCESSING

MATH OR OTHER
DATA CHANGES

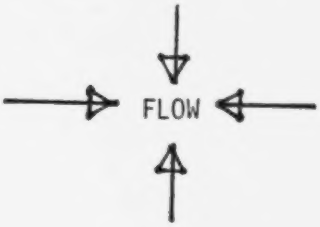


WHAT NEXT?

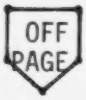


CONNECTOR

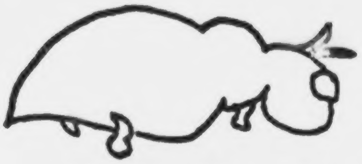
ENTRY OR EXIT



WHICH DIRECTION?

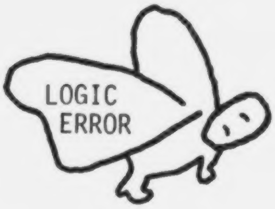


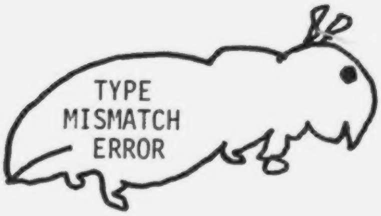
EXIT FROM OR
ENTRY TO A PAGE

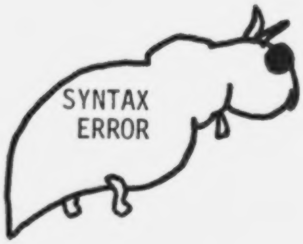
DE-  YOUR PROGRAM

OUT OF
DATA
ERROR

BAD
SUBSCRIPT
ERROR


LOGIC
ERROR


TYPE
MISMATCH
ERROR


SYNTAX
ERROR

SUPPLEMENTARY MATERIALS

Duplicating Masters

BASIC Programming Book A   MC-871
BASIC Programming Book B   MC-873
Opportunities for Learning, Inc.
20417 Nordhoff Street, Dept. 9
Chatsworth, CA 91311

Micro 2: Begin with BASIC. Ruby and Roberts. 03-5557-K5
J. Weston Walch, Publisher
P. O. Box 658
Portland, ME 04104-0658

Filmstrips/Cassettes

BASIC for Microcomputers
(EZ397) (5 filmstrips and 5 cassettes)
Career Aids, Inc.
20417 Nordhoff Street, Dept. U
Chatsworth, CA 91311

Computer Programming (in BASIC)
(6 filmstrips and 6 sound cassettes)
Bergwall Productions, Inc.
P. O. Box 238
Garden City, NY 11530-0238
800-645-3565

Flowcharting Explained
(# 076-84) (5 filmstrips and 5 cassettes)
Bergwall Productions, Inc.
P. O. Box 238
Garden City, NY 11530-0238
800-645-3565

Introduction to Programming
BASIC One, BASIC Two, BASIC Three, BASIC Four
Prismatron Productions, Inc.
155 Buena Vista Avenue
Mill Valley, CA 94941

Periodicals

Apple Orchard
P. O. Box 1493
Beaverton, OR 97075

Byte
P. O. Box 590
Martinville, NJ 08836

SUPPLEMENTARY MATERIALS continued

Computer Career News
Computer Career News Publishing Company
Box 1005
Oradell, NJ 07649

Creative Computing
P. O. Box 789-M
Morristown, NJ 07960

Home Computer
Emerald Valley Publishing Company
P. O. Box 70288
Eugene, OR 97401

Nibble
P. O. Box 325
Lincoln, MA 01773

Run
CW Communication/Peterborough, Inc.
80 Pine Street
Peterborough, NH 03458

T.H.E. Journal
P. O. Box 992
Acton, MA 01720

The Transactor
Transactor Publishing Company
500 Steeles Avenue
Milton, Ontario, Canada, L9T 3P7

Simulations

Robichaud, Muscat, and Hall. Data Processing Work Kit.
Gregg Division/McGraw-Hill Book Company, 1983.
P. O. Box 996
Norcross, GA 30091

Wanous, Wagner, and Lambert. Data Processing Applications.
South-Western Publishing Company, 1981.
11310 Gemini Lane
Dallas, TX 75229

SUPPLEMENTARY MATERIALS continued

Software

Learning the Special Symbols
(Apple and TRS 80 disk)
QUEUE, Inc.
5 Chapel Hill Drive
Fairfield, CT 06432
800-232-2224

Programming: Getting Started in Basic
QUEUE, Inc.
5 Chapel Hill Drive
Fairfield, CT 06432
800-232-2224

Textbooks

Clark, James F., and William O. Drum. Structured Basic.
Cincinnati: South-Western Publishing Company, 1983.
5101 Madison Road
Cincinnati, OH 45227

Edwards, Perry, and Bruce Broadwell. Flowcharting and BASIC.
New York: Harcourt Brace Jovanovich, Inc., 1974.
7555 Caldwell Avenue
Niles, IL 60648

Forkner, Irving, and Raymond McLeod, Jr. Computerized Business Systems: An Introduction to Data Processing.
John Wiley and Sons, Inc., 1973.
605 Third Avenue
New York, NY 10158

Lambrecht, Judith, and James F. Clark. Information Processing: Concepts, Principles, and Procedures.
Cincinnati: South-Western Publishing Company, 1985.
5101 Madison Road
Cincinnati, OH 45227

Mandell, Steven L. Computers and Data Processing Today.
St. Paul: West Publishing Company, 1983.
50 West Kellogg Boulevard
P. O. Box 3526
St. Paul, MN 55165

Orilia, Lawrence. Introduction to Business Data Processing.
New York: McGraw-Hill Book Company, 1979.
P. O. Box 996
Norcross, GA 30091

Shelly, Gary, and Thomas J. Cashman. Introduction to BASIC Programming.
Brea: Anaheim Publishing Company, 1982.
2632 Saturn Street
Brea, CA 92621

Thompson, Robert G. BASIC: A Modular Approach. 2nd ed.
Columbus: Charles E. Merrill Publishing Company
A Bell & Howell Company
Columbus, OH 43216

Wanous, S. J., Gerald Wagner, and Stephen F. Hallman. Introduction to Automated Data Processing. 2nd ed.
Cincinnati: South-Western Publishing Company, 1979.
5101 Madison Road
Cincinnati, OH 45227

Workbooks

Apple Computer Program Writing Workbook. 2N900
Career Aids, Inc.
20417 Nordhoff Street, Dept. U
Chatsworth, CA 91311

IBM Computer Program Writing Workbook. 2N902
Career Aids, Inc.
20417 Nordhoff Street, Dept. U
Chatsworth, CA 91311

BASICally Speaking. JW015508
(written for Apple, TRS-80, and PET microcomputers)
Career Aids, Inc.
20417 Nordhoff Street, Dept. U
Chatsworth, CA 91311

RESOURCES

Cashman, Thomas J., and Gary B. Shelly. *Introduction to BASIC Programming*. Brea, CA: Anaheim Publishing Company, 1983.

Clark, James F., and William O. Drum. *Structured BASIC*. Cincinnati: South-Western Publishing Company, 1983.

Jennings, Carol Ann. *Basic Programming*. Developed in cooperation with the Arkansas Vocational and Technical Education Division of the Arkansas Department of Education, 1982.

Jennings, Carol Ann, and Sandy McDonald. *Information Processing*. Developed by the Mid-America Vocational Curriculum Consortium, Inc., 1981.

Lavine, Ron M. *Introduction to Apple II BASIC*. Boston: Houghton Mifflin Company, 1984.

McQuigg, James D., and Alta M. Harness. *Flowcharting*. Boston: Houghton Mifflin Company, 1985.

Olinzock, Anthony, and Otto Santos. *Microcomputer Activities for Office Procedures*. Cincinnati: South-Western Publishing Company, 1984.

Olsen, Nancy Lee. *Beginning Programming on the IBM PC*. Indianapolis: Bobbs-Merrill Educational Publishing, 1984.

Presley, Bruce. *A Guide to Programming the Radio Shack TRS-80*. 2nd ed. Albany, NY: Delmar Publishers, Inc., 1985.

Presley, Bruce, and Ted Deckel. *A Beginner's Guide to the Apple*. Albany, NY: Delmar Publishers, Inc., 1984.

Shane, June Grant. *Programming for Microcomputers, Apple II BASIC*. Boston: Houghton Mifflin Company, 1983.

Specht, Robert T., and Ron M. Lavine. *Introduction to TRS-80 BASIC*. Boston: Houghton Mifflin Company, 1985.

Spencer, Donald D. *Learning BASIC for Microcomputers: A Worktext for Apple II, IIc, and IIe*. Columbus, OH: Charles E. Merrill Publishing Company, 1985.

UNIT IV

SOFTWARE APPLICATIONS

INTRODUCTION

Numerous prewritten software packages are available for all types and sizes of computers. The number of prewritten software packages has increased because of the rise in popularity of microcomputers.

The four most commonly used packages include word processing, data base (data-management), spreadsheet (modeling), and graphics. The packages frequently used by data processors in business and in homes are data base and spreadsheet.

The purpose of this unit is to introduce data base and spreadsheet software packages and provide activities necessary to acquaint students with this software.

COMPETENCIES

1. Demonstrate familiarity with data base and spreadsheet software packages used in business data processing.
2. Produce hard copies illustrating elementary reports using the available software.

GENERAL PERFORMANCE OBJECTIVES/GOALS

1. Identify the most commonly used software in business applications.
2. Contrast differences between data bases and spreadsheets.
3. Practice data entry using one or more types of software in business applications.

SPECIFIC PERFORMANCE OBJECTIVES AND MASTERY CRITERIA

1. On a written test, students will be able to list and explain at least five features typically included as part of data base management software.
2. On a written test, students will be able to list and explain at least five features typically included as part of spreadsheet software.

3. On a written test, students will be able to contrast with at least 75 percent accuracy differences between data base and spreadsheet programs.

4. At the terminal, students will be able to create a data base file and set up the record layout using the available software and hardware with 100 percent accuracy.

5. Given records in class, students will be able to enter records with at least 75 percent accuracy into a data base file.

6. Students will be able to delete specified records with 100 percent accuracy from a data base file.

7. Students will be able to add new records to an existing data base file with 100 percent accuracy.

8. Students will be able to make specified changes to existing records in a data base file with 100 percent accuracy.

9. Students will be able to search for specified records within a data base file with 100 percent accuracy.

10. Students will be able to sort records within a data base with 100 percent accuracy according to specified fields.

11. Students will be able to generate specified reports from a data base with 100 percent accuracy.

12. Students will be able to print reports generated from a data base with 100 percent accuracy.

13. Given business information in class, students will be able to enter with 100 percent accuracy primary and column headings (labels) in a spreadsheet using the available software and hardware.

14. Given an assignment in class, students will be able to enter data in proper rows and columns in a spreadsheet with 100 percent accuracy.

15. Given an assignment in class, students will be able to enter the appropriate formulas to perform simple math computations necessary to solve the problem with 100 percent accuracy.

16. Students will be able to erase specified values or labels from a spreadsheet with 100 percent accuracy.

17. Students will be able to insert a specified row or column within an existing worksheet with 100 percent accuracy.

18. Students will be able to save and retrieve specified worksheets with 100 percent accuracy.

19. Students will be able to clear an entire worksheet with 100 percent accuracy.

20. Students will be able to split a worksheet screen into vertical and horizontal windows to display columns and rows effectively with 100 percent accuracy.

21. Students will be able to replicate (copy) labels or formulas with 100 percent accuracy.

22. Students will be able to print spreadsheets with 100 percent accuracy.

23. Given statements related to data base and spreadsheet software and specialized terminology on a written test, students will be able to identify terms correctly with at least 75 percent accuracy.

METHODOLOGY

The purpose of this unit is to introduce the principal business software packages. Activities will be provided to acquaint students with these software packages.

Books, operators' manuals, training manuals, and periodicals listed in the supplementary materials section of this unit may be used to gather the topical information needed for the presentation of this unit.

SUGGESTED INTEREST APPROACHES

1. Have students prepare bulletin board displays to cover the most important aspects of this unit.
2. View slide presentations covering basic steps to use the principal business software packages.
3. Display a collection of reports generated by the principal business software packages.
4. Display a collection of advertising materials representing the principal business software packages.

UNIT OUTLINE

SOFTWARE APPLICATIONS

I. Data Base

- A. Definition
- B. Kinds
- C. Uses
- D. Advantages and disadvantages
- E. Creating the file
- F. Designing layout
- G. Entering data
- H. Changing, adding, deleting records
- I. Sorting
- J. Reporting

II. Spreadsheet

- A. Definition
- B. Types
- C. Uses
- D. Advantages and disadvantages
- E. Status area
- F. Entering data
  - 1. Headings
  - 2. Values
- G. Computing
- H. Changing, adding, deleting
- I. Replicating
- J. Splitting the screen
- K. Saving and retrieving
- L. Printing

SPECIFIC PERFORMANCE OBJECTIVES AND LEARNING ACTIVITIES

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1. On a written test, students will be able to list and explain at least five features typically included as part of data base management software.

Subject Matter Content	Learning Activities
Data Base Definition Kinds Uses	1. Read a teacher-prepared outline that describes the features and vocabulary of data base software.

2. Survey local businesses to determine what kinds of data base software are used; report to class.
3. Discuss various data base packages including advantages and disadvantages of each package.
4. Define data base terminology. (Appendix A)

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2. On a written test, students should be able to list and explain at least five features typically included as part of spreadsheet software.

Subject Matter Content	Learning Activities
Spreadsheet Definition Kinds Uses	1. Read a teacher-prepared outline that describes the features and vocabulary of spreadsheet software.
	2. Survey local businesses to determine what kinds of spreadsheet software are used; report to class.
	3. Discuss various spreadsheet packages including the advantages and disadvantages of each package.
	4. Define spreadsheet terminology. (Appendix B)

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3. On a written test, the students will be able to contrast with at least 75 percent accuracy differences between data base and spreadsheet.

Subject Matter Content	Learning Activities
Data Base and Spreadsheet	1. Discuss the capabilities of data base and spreadsheet.
	2. Discuss how data base and spreadsheet packages can best be used in the business environment and the home environment.
	3. Prepare a list of advantages and disadvantages of using a data base and a spreadsheet.

4. At the terminal, students will be able to create a data base file and set up the record layout using the available software and hardware with 100 percent accuracy.

Subject Matter Content	Learning Activities
Data Base Creating the file Designing layout	1. Read the instructions for creating a file using the available software documentation.
	2. View a demonstration on creating a data base file.
	3. Create a data base file for FBLA members.
	4. View a demonstration on how to set up the record layout for a file.
	5. Set up the record layout for FBLA members, including first and last name, full mailing address, phone number, grade, sex, and class schedule.

5. Given records in class, students will be able to enter records with at least 75 percent accuracy into a data base file.

Subject Matter Content	Learning Activities
Data Base Entering data	1. View a demonstration on the steps for entering records into a data base file.
	2. Enter the name, address, phone number, grade, sex, and class schedule of all FBLA members.

6. Students will be able to delete specified records with 100 percent accuracy from a data base file.

Subject Matter Content	Learning Activities
Data Base Changing, adding, deleting records	1. Read from the manual the instructions for deleting records from a data base file. 2. Delete from the file those students who are no longer active FBLA members.

7. Students will be able to add new records to an existing data base file with 100 percent accuracy.

Subject Matter Content	Learning Activities
Data Base Changing, adding, deleting records	1. View a demonstration on the procedures for adding new records to an existing file. 2. Add to the file the names of students who have become FBLA members for the first time this semester.

8. Students will be able to make specified changes to existing records in a data base file with 100 percent accuracy.

Subject Matter Content	Learning Activities
Data Base Changing, adding, deleting records	1. Study the changes that are to be made in the existing file. 2. View a demonstration on the procedures for making changes in existing records. 3. Make changes in addresses, phone numbers, class schedule, etc., for FBLA members during the school year.

9. Students will be able to search for specified records within a data base file with 100 percent accuracy.

Subject Matter Content	Learning Activities
Data Base Sorting	1. Read from the manual the instructions for searching for individual records. 2. Search and find the records of at least five names listed in the file.

10. Students will be able to sort records within a data base with 100 percent accuracy according to specified fields.

Subject Matter Content	Learning Activities
Data Base Sorting	1. View a demonstration on the procedures for sorting records according to specified fields. 2. Sort FBLA member records according to last name and grade level for FBLA members as shown in the student's class schedule.

11. Students will be able to generate specified reports from a data base with 100 percent accuracy.

Subject Matter Content	Learning Activities
Data Base Reporting	1. View a demonstration of procedures for generating a specified report. 2. Generate a report consisting of a title, the first and last names of all FBLA members, and the grade level of each member. 3. Generate a report consisting of a title, first and last names of all members, and their phone numbers.

12. Students will be able to print reports generated from a data base with 100 percent accuracy.

Subject Matter Content	Learning Activities
Data Base Reporting	1. Read from the manual the steps necessary for printing a report.
	2. Prepare the printer for printing a copy of the report.
	3. Print a hard copy of the prepared reports.

13. Given business information in class, students will be able to enter with 100 percent accuracy primary and column headings (labels) in a spreadsheet, using the available software and hardware.

Subject Matter Content	Learning Activities
Spreadsheet Entering data	1. View a demonstration of the steps necessary to enter headings in a spreadsheet.
	2. Enter primary and column headings on a spreadsheet project. (Appendix C, Step 1)

14. Given an assignment in class, students will be able to enter data in proper rows and columns in a spreadsheet.

Subject Matter Content	Learning Activities
Spreadsheet Entering data	1. Read from the manual the instructions for entering values in rows and columns on a spreadsheet.
	2. Enter data on a spreadsheet. (Appendix C, Step 2)

15. Given an assignment in class, students will be able to enter the appropriate formulas to perform simple math computations necessary to solve the problem with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Computing	1. View a demonstration on the steps necessary for entering math computations on a spreadsheet. 2. Enter formulas needed to complete calculations required on assigned spreadsheet. (Appendix C, Step 3)

16. Students will be able to erase specified values or labels from a spreadsheet with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Changing, adding, deleting	1. Study the changes to be made in an existing spreadsheet. 2. View a demonstration on the steps necessary to erase material from a spreadsheet. 3. Make deletions as assigned on spreadsheet problem. (Appendix C, Step 4)

17. Students will be able to insert a specified row or column within an existing worksheet with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Changing, adding, deleting	1. View a demonstration on the steps necessary to insert rows and columns on an existing spreadsheet. 2. Insert new information into an existing spreadsheet. (Appendix C, Step 5)

18. Students will be able to save and retrieve specified worksheets with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Saving and retrieving	1. Read from the manual the instructions for saving and retrieving worksheets. 2. Save the spreadsheet currently on the screen. 3. Clear the screen. 4. Retrieve the previous spreadsheet.

19. Students will be able to clear an entire worksheet with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Changing, adding, deleting	1. Read from the manual the instructions for clearing a spreadsheet. 2. Clear the worksheet currently on the screen.

20. Students will be able to split a worksheet screen into vertical and horizontal windows to display columns and rows effectively with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Splitting the screen	1. View a demonstration on the steps necessary to split a spreadsheet on the screen. 2. Split an existing spreadsheet vertically. (Appendix D, Step 1) 3. Split an existing spreadsheet horizontally. (Appendix D, Step 2)

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21. Students will be able to replicate (copy) labels or formulas with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Replicating	1. Read from the manual the instructions for replicating. 2. Replicate formulas to complete computations as assigned on spreadsheet problem. (Appendix D, Step 3)

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22. Students will be able to print spreadsheets with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheets Printing	1. View a demonstration of the steps necessary to print a spreadsheet. 2. Prepare the printer. 3. Print the spreadsheet currently on the screen.

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23. Given statements related to data base and spreadsheet software and specialized terminology on a written test, students will be able to identify terms correctly with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Data Base and Spreadsheet	1. Write two sentences using each data base term. 2. Construct a crossword puzzle using the data base terminology. 3. Write two sentences using each spreadsheet term. 4. Construct a find-a-word puzzle using the spreadsheet terminology.

APPENDIX A

Vocabulary List

Directions: Define the following data base terms using software documentation and notes taken in class. Be sure to spell these terms as you are defining them.

1. add
2. character
3. data
4. data base
5. delete
6. expand
7. field
8. field data
9. field heading
10. field indicator
11. field length
12. file
13. format
14. hanging paragraphs
15. inquire
16. insert
17. justifying
18. key field
19. layout
20. print
21. record
22. report
23. scan
24. screen
25. search
26. segment
27. store
28. update

APPENDIX B

VOCABULARY LIST

Directions: Define the following spreadsheet terms using software documentation and notes taken in class. Be sure to spell these terms correctly as you are defining them.

1. arrange
2. blank
3. calculating
4. clear
5. column
6. coordinates
7. cursor
8. default
9. delete
10. edit line
11. entry line
12. file name
13. format
14. formula
15. global
16. horizontal
17. label
18. load
19. print
20. prompt line
21. quit
22. replicate
23. row
24. screen
25. scroll
26. split
27. status area
28. store
29. synchronize
30. title
31. value
32. vertical
33. window

APPENDIX C

SPREADSHEET APPLICATION

Directions: Load the available spreadsheet software to bring an empty spreadsheet form to the screen. Complete the steps below as directed by the teacher. Ask the teacher to check the completion of each step before proceeding.

1. Enter the following primary and column headings on the spreadsheet.

	A	B	C	D	E
1	NAME	Week 1	Week 2	Week 3	Week 4
2					
.					
.					
.					

2. Enter the following data on the spreadsheet.

	A	B	C	D	E
2	Adams	135	140	142	143
3	Jones	168	171	170	167
4	Morrison	145	144	147	145
5	Richard	152	154	151	154
6	Weber	136	136	137	138

3. Enter a formula in cell B7 to add all the values in column B to obtain a department weekly production total. Enter formulas to determine totals for columns C, D, and E.

4. Delete the production line for the employee named Weber.

5. a) Add the information for Mr. Hebert (his name and production information were omitted earlier). Be sure to maintain the alphabetical order of the employees.

Hebert	160	162	163	161

   b) Add information for weeks 5, 6, 7, and 8.

	F	G	H	I
1	Week 5	Week 6	Week 7	Week 8
2	140	138	137	141
3	162	164	164	168
4	166	169	171	171
5	142	145	145	146
6	150	152	152	154

APPENDIX D

SPREADSHEET APPLICATION

Directions: Load the Production Spreadsheet (from Appendix C) into the computer memory and call it up on the screen. Complete the steps below as directed by the teacher. Ask the teacher to check the completion of each step before proceeding.

1. Use the window feature of the spreadsheet to split the spreadsheet horizontally (side by side) between columns E and F.

2. Use the window feature of the spreadsheet to split the spreadsheet vertically (top and bottom) between the lines for Hebert and Morrison.

3. Enter a formula to calculate an eight-week total production for Adams. Use the replicate feature of the spreadsheet to calculate an eight-week total production for each of the other employees listed on the spreadsheet.

UNIT TEST

SOFTWARE APPLICATIONS

A. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents your answer in the space next to each statement.

Column A

_____ 1. The name given to the programs that cause a computer to carry out particular operations.

_____ 2. A management information system that contains basic data commonly defined and consistently organized to fit the information needs of a wide variety of users.

_____ 3. A software package used by accountants for performing financial calculations and recording transactions.

_____ 4. An assumption made by a system when no specific choice is given by the user.

_____ 5. A data processing feature that allows the user to look for a word or set of characters that needs to be located throughout the document.

_____ 6. A collection of related items of data treated as a unit.

_____ 7. A feature that allows more than one section of a spreadsheet to be viewed concurrently.

_____ 8. A software package that allows the user to display images on the display screen or a printer.

Column B

A. Data Base

B. Deletion

C. Default

D. Format

E. Graphic Software Package

F. Insertion

G. Record

H. Scrolling

I. Search

J. Software

K. Spreadsheet

L. Status Area

M. Window

N. Word Processing

_____ 9. A data processing feature that allows the removal of characters, words, sentences, or parts of a file.

_____ 10. A process of positioning a portion of a document on a display screen.

_____ 11. A feature that allows characters, words, sentences or blocks of information to be inserted into a document.

_____ 12. The specific arrangement of data.

_____ 13. The use of a computer to perform text-editing and formatting.

_____ 14. A part of an electronic spreadsheet that appears at the top of the display and shows the location of the cursor within the spreadsheet.

B. ESSAY

Directions: Answer each item using complete sentences.

1. List and explain the major differences between the capabilities of a data base package and a spreadsheet package.

2. List and explain five features typically included as part of a data base management program.

3. List and explain at least five features typically included as part of a spreadsheet program.

UNIT TEST

ANSWER KEY

A. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents your answer in the space next to each statement.

Column A

J 1. The name given to the programs that cause a computer to carry out particular operations.

A 2. A management information system that contains basic data commonly defined and consistently organized to fit the information needs of a wide variety of users.

K 3. A software package used by accountants for performing financial calculations and recording transactions.

C 4. An assumption made by a system when no specific choice is given by the user.

I 5. A data processing feature that allows the user to look for a word or set of characters that needs to be located throughout the document.

G 6. A collection of related items of data treated as a unit.

M 7. A feature that allows more than one section of a spreadsheet to be viewed concurrently.

E 8. A software package that allows the user to display images on the display screen or a printer.

Column B

A. Data Base
B. Deletion
C. Default
D. Format
E. Graphic Software Package
F. Insertion
G. Record
H. Scrolling
I. Search
J. Software
K. Spreadsheet
L. Status Area
M. Window
N. Word Processing

B 9. A data processing feature that allows the removal of characters, words, sentences, or parts of a file.

H 10. A process of positioning a portion of a document on a display screen.

F 11. A feature that allows characters, words, sentences or blocks of information to be inserted into a document.

D 12. The specific arrangement of data.

N 13. The use of a computer to perform text-editing and formatting.

L 14. A part of an electronic spreadsheet that appears at the top of the display and shows the location of the cursor within the spreadsheet.

B. ESSAY

Directions: Answer each item, using complete sentences.

1. List and explain the major differences in the capabilities of a data base package and a spreadsheet package.

   A data base package is used for recording and filing information, while a spreadsheet package is used for financial and computational purposes.

2. List and explain five features typically included as part of a data base management program.

   Possible features students could discuss:

   A. The operator can choose specific fields to "search" through records.
   B. Data can be entered and displayed in different ways.
   C. Calculations can be performed to allow totals to be kept up-to-date.
   D. Reports can be designed and printed in different ways.

- E. Individual records can be added, deleted, or changed at random.
- F. Various kinds of label formats can be designed.

3. List and explain at least five features typically included as part of a spreadsheet program.

Possible features students could discuss:

- A. The program itself is the operator's calculator, complete with built-in functions and commands it has been programmed to understand.
- B. Columns or rows of information can be added, deleted, or moved.
- C. Labels, values, or formulas can be replicated.
- D. The program completes automatic recalculation when a number or formula in a cell is changed.
- E. A windowing capability allows different segments of a large spreadsheet to be viewed concurrently.

EVALUATION AND TESTING

Ways to Evaluate Pupil Growth

- Class notebook
- Data Base reports
- Spreadsheet reports
- Survey report
- Unit test

EQUIPMENT AND SUPPLIES

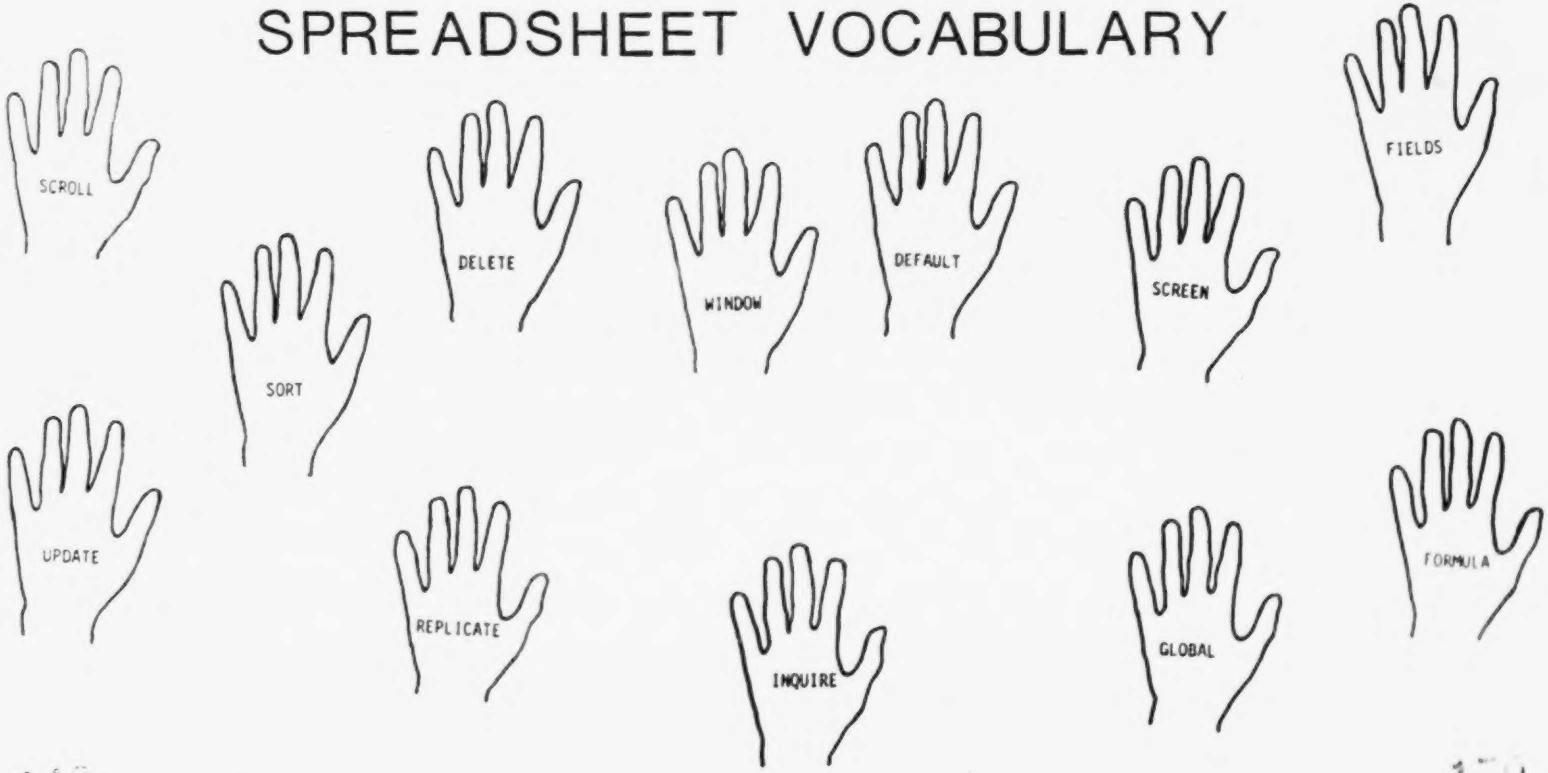
Student

Microcomputer
Data Base Software
Spreadsheet Software
Training Manuals
Printer
Paper

Teacher

Data Base Software
Spreadsheet Software
Training Manuals
Chalk
Overhead Projector
Transparencies
Bulletin Board Materials

REACH FOR THE ☀ ☾ AND ★★★ WITH CORRECT DATA BASE AND SPREADSHEET VOCABULARY


SCROLL
SORT
DELETE
WINDOW
DEFAULT
SCREEN
FIELDS
UPDATE
REPLICATE
INQUIRE
GLOBAL
FORMULA

BREAK OUT WITH DATA PROCESSING SOFTWARE--

1. WORD PROCESSING
2. DATA BASE
3. SPREADSHEETS
4. GRAPHICS

SUPPLEMENTARY MATERIALS

Diskettes

The Uses of a Data Base
4M-600
(Available for Apple II with 48K)
Opportunities for Learning, Inc.
20417 Nordhoff Street, Dept. 9F
Chatsworth, CA 91311

Filmstrips/Cassettes

Introduction to the Microcomputer
(Understanding the Microcomputer, Microcomputer Hardware, and Microcomputer Software)
(3 Filmstrips and Cassettes)
Career Aids, Inc.
20417 Nordhoff Street, Dept. U
Chatsworth, CA 91311

Software Packages

AppleWorks
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014

dBASE II and dBASE III
Ashton-Tate
10150 W. Jefferson Blvd.
Culver City, CA 90230

Profile III Plus
Radio Shack
A Division of the Tandy Corporation
300 One Tandy Center
Fort Worth, TX 67102

Lotus 1-2-3 and Symphony
Lotus Development Corp.
161 First Street
Cambridge, MA 02142

Multiplan
Microsoft Corp.
10700 Northup Way
Bellevue, WA 98004

SUPPLEMENTARY MATERIALS continued

PFS:File and PFS:Plan
Software Publishing Corp.
1901 Landings Drive
Mountain View, CA 94043

SuperCalc, SuperCalc2 and SuperCalc3
Sorcim Corp.
2310 Lundy Avenue
San Jose, CA 95131

VisiCalc and VisiCalc IV
VisiCorp
2895 Zanker Road
San Jose, CA 95134

RESOURCES

Castlewitz, David M. *The VisiCalc Program Made Easy*. Berkeley, CA: OSBORNE/McGraw-Hill, 1983.

Castlewitz, David M., and Lawrence J. Chisausky, with Patricia Knonberg. *VISICALC Home and Office Companion*. Berkeley, CA: OSBORNE/McGraw-Hill, 1982.

Clark, James F., and Judith J. Lambrecht. *Information Processing*. Cincinnati: South-Western Publishing Co., 1985.

Coburn, Edward J. *Microcomputers: Hardware, Software, & Programming*. Indianapolis: Bobbs-Merrill Educational Publishing, 1984.

Desautels, Edouard J. *VisiCalc for the TRS-80 Models III and 4 Computers*. 2nd ed. Dubuque, IA: Wm. C. Brown Publishers, 1984.

Everest, G. C. *Database Management: Objectives, System Functions, and Administration*. New York: McGraw-Hill Book Company, 1984.

Grushcow, Jack. *The VisiCalc Applications Book*. Reston, VA: Reston Publishing Company, Inc., 1983.

Mandell, Steven L. *Computers and Data Processing*. 3rd ed. St. Paul, MN: West Publishing Company, 1985.

Schnake, Marilyn A. *The World of Computers and Data Processing*. St. Paul, MN: West Publishing Co., 1985.

Spencer, Donald D. *The Illustrated Computer Dictionary*. Rev. ed. Columbus, OH: Charles E. Merrill Publishing Co., 1983.

Stern, Robert A., and Nancy Stern. *An Introduction to Computers and Information Processing*. New York: John Wiley & Sons, 1985.

Williams, Robert E. *The Manual: AppleWorks*. Portland, OR: Management Information Source, Inc., 1985.

UNIT V

COMPUTER SYSTEMS

INTRODUCTION

Even though an individual may have no need to actually write computer programs, he does need to understand the fundamentals of computer hardware. In today's home and business environment, there is a need for a working knowledge of the different components of a computer system and the particular functions of each component.

The purpose of this unit is to familiarize students with the ways in which computers work and to provide learning activities which teach the basics of computer systems.

COMPETENCIES

1. Become familiar with the basic principles of computer systems.
2. Develop a knowledge of how a computer works.

GENERAL PERFORMANCE OBJECTIVES/GOALS

1. Understand and discuss the types of computer systems.
2. Develop a detailed understanding of the operations involved in a data processing cycle including the basic components of a computer system.
3. Identify the methods in which data can be stored.

SPECIFIC PERFORMANCE OBJECTIVES AND MASTERY CRITERIA

1. On a written test, students will be able to compare with at least 75 percent accuracy the four types of computer systems--mainframe computers, minicomputers, microcomputers, and supercomputers--based on descriptions of size, approximate cost, and uses.
2. Students will be able to describe what happens to the data during each of the following operations--input, processing, and output--on a written test with at least 75 percent accuracy.

3. Students will be able to explain the function of each of the four major components of a computer system--input, memory, central processing unit (CPU), and output--on a written test with at least 75 percent accuracy.

4. In class, students will be able to explain the use of the input, processor, output, and storage units of both personal and large computers.

5. Given a diagram of the basic components of a computer system on a written test, students will be able to label the numbered parts with at least 75 percent accuracy.

6. Students will be able to collect information and present an oral report on the latest technology used for auxiliary storage in computer systems. Reports will be evaluated on a checklist.

7. Given a list of terms and definitions related to computer systems on a written test, students will be able to match the terms with the definitions with at least 75 percent accuracy.

8. Given statements related to computer systems on a written test, students will be able to identify whether the statements are true or false with at least 75 percent accuracy.

9. In class, students will be able to explain the differences between main computer storage and auxiliary storage.

10. Students will be able to prepare a two-page paper relating to the current trends in input/output devices. Papers will be evaluated on a checklist.

11. Given a situation, students will be able to evaluate the input/output devices being used to determine if improvements or changes should be recommended.

12. In class, students will be able to contrast sequential access and direct access storage devices.

13. In class, students will be able to illustrate data being stored in addressable main computer memory.

14. On a written test, students will be able to list and explain with at least 75 percent accuracy the steps that occur when a computer system executes an instruction.

15. Students will be able to prepare a written report on the computer system used by their school. Information will be evaluated with the use of a checklist.

METHODOLOGY

The purpose of this unit is to familiarize students with the ways in which computers work and to provide learning activities which teach the basics of computer systems.

Periodicals, field trips, guest speakers, and audiovisual aids will be used to incorporate content not covered in the teacher's lectures. Many of these activities and sources are listed in the supplementary section of this unit.

SUGGESTED INTEREST APPROACHES

1. Invite a computer employee from the business community to speak on computer systems.
2. Assign reading of articles on computer systems and have students report orally on the findings.
3. Have students prepare charts, displays, and bulletin boards to stress important aspects of the unit.
4. Display a collection of various periodicals representing current literature on computer systems.
5. View audiovisual materials associated with the unit.
6. Plan a tour to a large company using computer systems to give the students an overview of how a computer system works.

UNIT OUTLINE

COMPUTER SYSTEMS

I. Types of Computer Systems (size, cost, uses)

   A. Mainframe
   B. Minicomputer
   C. Microcomputer
   D. Supercomputer

II. Components of a Computer

   A. Definitions
      1. data
      2. input unit
      3. processor unit
      4. output unit

B. Central processing unit
   1. arithmetic
   2. control
   3. memory
      a. RAM (Random Access Memory)
      b. ROM (Read Only Memory)

C. Input devices and media
   1. card reader/punch cards
   2. tape drive/magnetic tape
   3. disk drive/magnetic disk
   4. MICR (Magnetic Ink Character Recognition)
   5. CRT (Cathode Ray Tube)
   6. voice

D. Output devices and media
   1. card punch/punched cards
   2. tape drive/magnetic tape
   3. disk drive/magnetic disk
   4. CRT/screen
   5. printers
   6. plotters
   7. COM (Computer Output Microfilm)

E. Storage devices
   1. main storage
      a. semiconductor memory
      b. magnetic core storage
   2. auxiliary storage
      a. media
         1. magnetic disks
         2. magnetic tapes
         3. magnetic drums
      b. accessing data stored on auxiliary storage
         1. sequential
         2. direct or random

SPECIFIC PERFORMANCE OBJECTIVES AND LEARNING ACTIVITIES

1. On a written test, students will be able to compare with at least 75 percent accuracy the four types of computer systems--mainframe computers, minicomputers, microcomputers, and supercomputers--based on descriptions of size, approximate cost, and uses.

Subject Matter Content	Learning Activities
Types of Computer Systems	1. View an audiovisual aid concerning the different types of computer systems.

2. Collect magazine advertisements and articles about the different types of computer systems currently on the market.

3. Make a chart on each type of computer system and include size, cost, and uses.

4. Prepare a bulletin board display that will compare the types of computer systems.

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2. Students will be able to describe what happens to the data during each of the following operations--input, processing, and output--on a written test with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Components of a Computer	1. View transparencies that will enhance understanding of input, processing, and output cycle. 2. Compare the function of each computer component to a specified human task. Examples: garment construction, cooking, gardening. 3. Collect samples of punched cards, floppy disks, magnetic tape, a disk pack, etc., when discussing input, output, and storage devices. 4. Prepare charts that will describe various input/output devices with operating speed range. 5. Read and discuss terminology associated with the components of a computer system.

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3. Students will be able to explain the function of each of the four major components of a computer system--input, memory, central processing unit (CPU), and output--on a written test with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Components of a Computer	1. Tour a large company to view the operation processes of computer systems.
	2. Discuss the main computer features viewed on the tour.
	3. Visit a modern office to observe how computers are used by workers.
	4. React to a presentation given by a computer employee on how a computer works.
	5. View transparencies that will enhance understanding of functions.
	6. View audiovisual aids that illustrate the functions of computer components.

---

4. In class, students will be able to explain the use of the input, processor, output, and storage units of both personal computers and large computers.

Subject Matter Content	Learning Activities
Types of Computer Systems Mainframe Microcomputer	1. Visit companies that sell computers and collect brochures and pamphlets describing various computers.
	2. Research and discuss in groups the use of the input, processor, output, and storage units by personal computers and large computers. (Use brochures and pamphlets from Activity 1.)

	3. Work in groups and discuss the differences between personal computers and large computers. 4. Contact a sales representative from a personal computer or large mainframe computer company and ask for an explanation of the company's products.

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5. Given a diagram of the basic components of a computer system, students will be able to label on a written test the numbered parts with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Components of a Computer	1. List the components of a computer system. (Appendix A) 2. View an overhead transparency of computer components. 3. Prepare a display of current information on input units, processor units, and output units.

---

6. Students will be able to collect information and present an oral report on the latest technology used for auxiliary storage for computer systems. Reports will be evaluated on a checklist.

Subject Matter Content	Learning Activities
Auxiliary storage	1. Collect current publications concerning the latest auxiliary storage technology used in computer systems. 2. Research the latest auxiliary storage technology and bring to class documentation specifying the cost and uses. 3. Present a report of the findings to the class. (Appendices B1 and B2)

7. Given a list of terms and definitions related to computer systems on a written test, students will be able to match the terms with the definitions with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Computer Systems	1. Complete a word find puzzle. (Appendix C) 2. Prepare note cards with words and definitions related to computer systems.

8. Given statements related to computer systems on a written test, students will be able to identify whether the statements are true or false with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Computer Systems	1. Compose on note cards true/false questions related to computer system concepts. 2. Organize two teams and compete by responding to true/false questions. If the statement is false, the player must indicate why it is false. (Offer points for correct responses. Give extra points for the winning team on the unit test.)

9. In class, students will be able to explain the differences between main computer storage and auxiliary storage.

Subject Matter Content	Learning Activities
Storage Devices Main Storage and Auxiliary Storage	1. Visit a local data processing installation center and determine the kinds of data stored on main storage and auxiliary storage for a typical application. 2. Discuss the findings of the visit with the class.

3. Consult technical trade journals to explore the various new methods used for main storage and auxiliary storage.

4. Discuss these main storage and auxiliary storage methods specifying their advantages and disadvantages and predict which will be successful in the future.

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10. Students will be able to write a two-page paper relating to the current trends in input/output devices. Papers will be evaluated on a checklist.

Subject Matter Content	Learning Activities
Input devices and media Output devices and media	1. Research current literature for information concerning trends in input and output devices.
	2. Write a two-page paper relating to the current trends in input/output devices. A checklist will be used for evaluation. (Appendix D)

---

11. Given a situation, students will be able to evaluate the input/output devices being used to determine if improvements or changes should be recommended.

Subject Matter Content	Learning Activities
Input devices and media Output devices and media	1. Work in small groups and evaluate a given situation to determine if improvements or changes should be recommended for input/output devices being used.
	2. List improvements or changes to be recommended for input/output devices being used in a given situation.

12. In class, students will be able to contrast sequential access and direct access storage devices.

Subject Matter Content	Learning Activities
Accessing data stored on auxiliary storage	1. Make a poster illustrating sequential access and direct access storage devices. 2. Compare sequential access and direct access storage devices. 3. View transparencies that illustrate the specifics of sequential and direct access storage.

13. In class, students will be able to illustrate data being stored in addressable main computer memory.

Subject Matter Content	Learning Activities
Main storage	1. Collect pictures, diagrams, and brochures illustrating kinds of data to be stored in main computer memory. 2. Prepare a bulletin board using information in activity 1. 3. Make transparencies that illustrate how and where fields of data are stored in main computer memory.

14. On a written test, students will be able to list and explain with at least 75 percent accuracy the steps that occur when a computer system executes an instruction.

Subject Matter Content	Learning Activities
Central processing unit	1. View audiovisual materials that will enhance the understanding of how typical instructions are executed by a computer.

2. Visit a local business that uses a computer and view how various instructions can be executed by a computer.

3. Prepare a poster illustrating how instructions are executed by a computer.

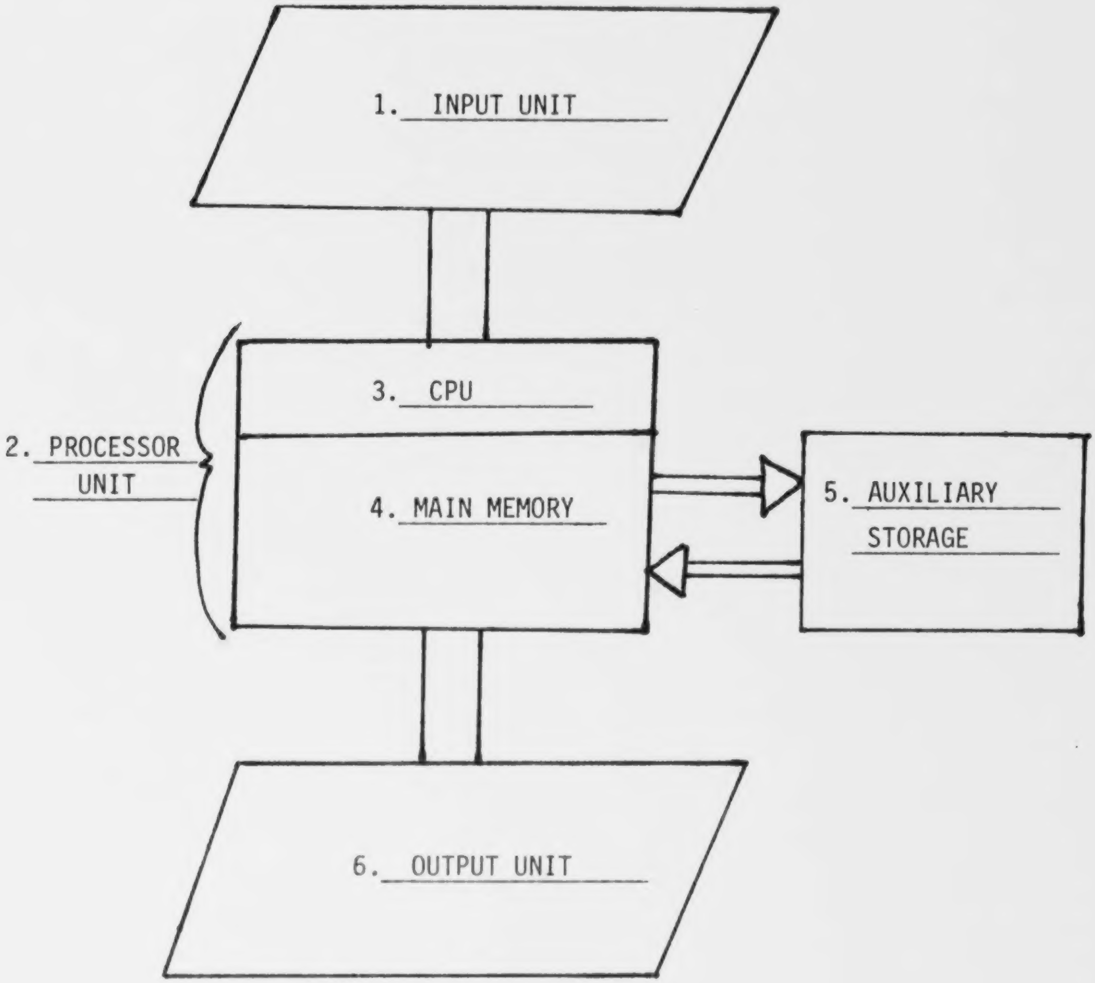
---

15. Students will be able to prepare a written report on the computer system used by the school. Information will be evaluated with the use of a checklist.

Subject Matter Content	Learning Activities
Computer Systems	1. Visit the school's computing center or various school departments using computers and collect information concerning the computer system. 2. Prepare a written report on the findings described in Activity 1. A checklist will be used for evaluation. (Appendix E)

APPENDIX A

COMPONENTS OF A COMPUTER SYSTEM


1. INPUT UNIT
2. PROCESSOR UNIT
3. CPU
4. MAIN MEMORY
5. AUXILIARY STORAGE
6. OUTPUT UNIT

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APPENDIX B1

ORAL REPORT CHECKLIST

STUDENT'S NAME____________________ TOPIC____________________

5--excellent 4--above average 3--average 2--below average 1--poor

ORGANIZATION OF REPORT	5	4	3	2	1
Introduction					
Body Content					
Conclusion					
PRESENTATION OF REPORT					
Eye Contact					
Facial Expression					
Posture and Gestures					
Comprehension of Material					
VOICE					
Volume					
Inflection					
Expression					
SPEECH					
Distinctness					
Clarity					
Choice of Words					
Appropriate Pace					

TOTAL POINTS EARNED____________________

COMMENTS____________________

____

____
Evaluator's Signature

*Used with the permission of Kathleen Audiffred and LaRue Speights of East St. John High School.

APPENDIX B2

POSSIBLE GRADING SCALE FOR REPORT

70 - 65 -- A

64 - 58 -- B

57 - 50 -- C

49 - 45 -- D

Less - - - F

APPENDIX C

VOCABULARY

arithmetic
auxiliary storage
card reader
central processing unit
chip
COM (Computer Output Microfilm)
control
CRT (Cathode Ray Tube)
disk drive
floppy disk
input
magnetic disk
magnetic drum
magnetic tape
magnetic core storage
main storage
mainframe computer
memory
MICR (Magnetic Ink Character Recognition)
microcomputer
minicomputer
output
plotter
printer
processor unit
punch card
RAM (Random Access Memory)
ROM (Read Only Memory)
semiconductor memory
supercomputer
tape drive

APPENDIX C

WORD FIND

R	D	A	R	I	T	H	M	E	T	I	C	C	X	M	T	L	V	Y	R	S	A	T	U	L	A	D	C
O	P	R	O	L	T	V	A	C	Z	X	O	O	P	L	M	M	O	S	U	C	U	X	Y	M	I	C	R
M	L	T	M	V	N	R	R	S	M	N	M	L	N	O	D	G	H	J	K	W	X	C	D	A	L	A	T
M	O	C	A	D	B	O	S	L	L	N	P	C	I	T	E	A	Y	E	K	T	I	O	I	I	A	S	D
L	K	J	G	A	D	F	J	E	W	I	U	C	V	C	R	T	R	E	W	O	L	I	U	N	Y	I	O
P	H	B	N	B	N	F	W	I	R	F	T	F	D	S	A	O	U	K	I	C	I	M	E	S	Z	A	B
E	T	H	E	L	E	I	Y	R	A	D	E	M	Y	R	A	W	L	I	N	L	A	I	Y	T	E	N	N
I	N	E	T	Y	L	L	C	A	R	D	R	E	A	D	E	R	A	S	B	E	R	Y	T	O	T	E	D
R	N	A	I	D	E	T	T	E	E	B	S	R	E	A	I	C	A	L	K	J	Y	J	E	R	N	I	E
T	I	F	C	H	I	P	F	A	B	Y	Y	N	T	A	F	T	C	E	W	A	S	P	R	A	I	D	E
Y	N	N	T	O	L	A	N	D	A	D	S	A	M	I	K	B	E	R	L	Y	T	U	J	G	U	D	T
R	U	S	A	S	L	L	E	A	R	E	T	U	P	M	O	C	I	N	I	M	O	N	M	E	Y	C	I
N	D	T	P	E	N	B	B	N	A	F	E	R	S	A	L	A	O	U	D	G	R	C	H	R	R	A	Y
D	N	A	E	E	A	L	G	K	U	R	M	E	M	O	R	Y	T	N	D	A	A	H	E	N	A	I	M
C	E	C	R	D	I	C	E	A	P	L	S	E	P	L	U	A	M	G	R	A	G	C	P	E	P	S	I
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P	R	O	C	E	S	S	O	R	U	N	I	T	H	O	L	T	D	I	I	N	T	R	E	S	U	I	T
I	E	M	O	W	R	U	P	R	A	S	D	F	G	H	I	N	P	U	T	J	K	D	S	E	A	E	I
A	S	E	F	D	E	R	J	K	L	U	D	S	E	W	O	A	Z	R	A	M	I	E	K	G	M	I	R
F	O	R	U	M	I	C	R	O	C	O	M	P	U	T	E	R	A	S	E	F	E	D	G	A	S	E	W
L	K	J	H	N	H	D	E	W	I	S	S	D	F	R	E	L	A	L	O	I	E	L	G	R	S	C	X
A	S	D	T	T	H	J	K	L	O	P	Y	T	P	L	P	H	K	I	F	S	B	N	N	O	T	U	S
S	A	E	E	K	L	O	I	P	I	Y	L	S	D	R	W	O	Z	X	C	B	E	N	A	T	A	O	U
J	R	I	T	T	I	W	I	O	U	N	V	O	O	K	H	R	J	H	F	T	J	N	K	S	I	X	P
F	J	D	E	O	P	L	S	J	K	L	L	C	T	K	E	Y	T	L	I	E	X	R	R	E	F	C	E
F	L	O	P	P	Y	D	I	S	K	S	E	P	E	T	E	W	T	C	C	E	W	O	A	R	Z	O	R
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H	S	O	U	E	M	X	N	C	T	O	T	W	P	M	W	C	X	I	I	O	I	P	P	I	R	R	P
C	A	R	P	S	D	G	B	R	C	U	I	D	G	E	G	R	A	E	T	S	P	I	A	T	I	C	U
C	R	E	E	M	U	A	C	E	A	T	C	U	E	C	X	Z	Z	Z	K	X	X	X	Y	E	T	T	T
H	A	P	P	N	E	B	M	P	B	P	B	B	E	W	A	L	L	D	L	K	K	K	S	N	S	S	E
S	A	D	I	D	E	A	N	X	R	U	E	P	U	T	C	O	R	M	M	L	O	P	I	G	A	L	R
O	O	T	U	U	R	M	O	C	R	T	A	P	E	D	R	I	V	E	T	I	E	M	I	A	D	O	G
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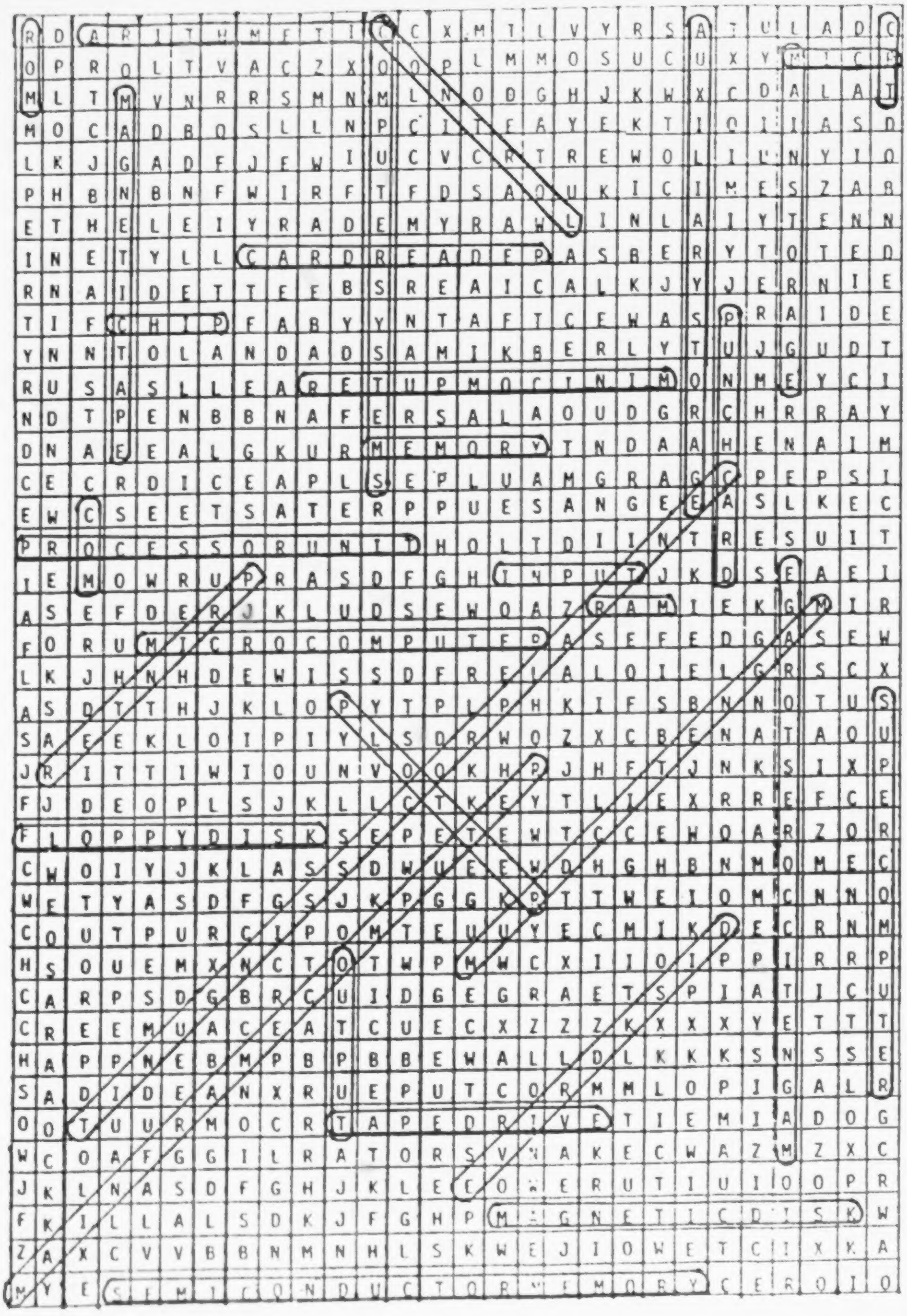
M	Y	E	S	E	M	I	C	O	N	D	U	C	T	O	R	M	E	M	O	R	Y	C	E	R	O	I	O

APPENDIX C

ANSWER KEY



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S	A	E	E	K	L	O	I	P	I	Y	L	S	D	R	W	O	Z	X	C	B	E	N	A	T	A	O	U
J	R	I	T	T	I	W	I	O	U	N	V	O	O	K	H	P	J	H	F	T	J	N	K	S	I	X	P
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H	S	O	U	E	M	X	N	C	T	O	T	W	P	M	W	C	X	I	I	O	I	P	P	I	R	R	P
C	A	R	P	S	D	G	B	R	C	U	I	D	G	E	G	R	A	E	T	S	P	I	A	T	I	C	U
C	R	E	E	M	U	A	C	E	A	T	C	U	E	C	X	Z	Z	Z	K	X	X	X	Y	E	T	T	T
H	A	P	P	N	E	B	M	P	B	P	B	B	E	W	A	L	L	D	L	K	K	K	S	N	S	S	E
S	A	D	I	D	E	A	N	X	R	U	E	P	U	T	C	O	R	M	M	L	O	P	I	G	A	L	R
O	O	T	U	U	R	M	O	C	R	T	A	P	E	D	R	I	V	E	T	I	E	M	I	A	D	O	G
W	C	O	A	F	G	G	I	L	R	A	T	O	R	S	V	N	A	K	E	C	W	A	Z	M	Z	X	C
J	K	L	N	A	S	D	F	G	H	J	K	L	E	C	O	W	E	R	U	T	I	U	I	O	O	P	R
F	K	I	L	L	A	L	S	D	K	J	F	G	H	P	M	A	G	N	E	T	I	C	D	I	S	K	W
Z	A	X	C	V	V	B	B	N	M	N	H	L	S	K	W	E	J	I	O	W	E	T	C	I	X	K	A
M	Y	E	S	E	M	I	C	O	N	D	U	C	T	O	R	M	E	M	O	R	Y	C	E	R	O	I	O

APPENDIX D

WRITTEN REPORT EVALUATION--INPUT/OUTPUT DEVICES

STUDENT'S NAME____________________ TOPIC________________________

**10 is the highest possible score in each category.

POINTS EARNED CATEGORIES AND COMMENTS

__________ 1. Neatness--(comments)________________________________

__________ 2. Subject/Verb Agreement (comments)____________________

__________ 3. Spelling--(comments)________________________________

__________ 4. Punctuation/Capitalization--(comments)______________

__________ 5. Introductory Paragraph--(comments)__________________

__________ 6. Body Content or Organization--(comments)____________

__________ 7. Concluding Paragraph--(comments)____________________

__________ 8. Word Usages--(comments)_____________________________

__________ 9. Following Directions--(comments)___________________

__________ 10. Degree of Preparation--(comments)_________________

__________TOTAL POINTS EARNED (possible 100)

__________GRADE EARNED

____
EVALUATOR'S SIGNATURE

*Used with the permission of Kathleen Audiffred of East St. John High.

APPENDIX E

WRITTEN REPORT EVALUATION--COMPUTER EVALUATION

STUDENT'S NAME____________________ TOPIC____________________

**10 is the highest possible score in each category.

POINTS EARNED CATEGORIES AND COMMENTS

__________ 1. Neatness--(comments)______________________________

__________ 2. Subject/Verb Agreement (comments)______________________________

__________ 3. Spelling--(comments)______________________________

__________ 4. Punctuation/Capitalization--(comments)______________________________

__________ 5. Introductory Paragraph--(comments)______________________________

__________ 6. Body Content
- a. Name of system
- b. Type of language
- c. Number of CPU's
- d. Size and number of real memory
- e. Code used to store data within real memory
- f. Numbering system used
- g. Amount of online disk storage space
- h. Major functions supported by operating system
- i. Type of applications run on the system
- j. Input and Output devices attached to system

__________ 7. Concluding Paragraph--(comments)______________________________

__________ 8. Word Usages--(comments)______________________________

__________ 9. Following Directions--(comments)______________________________

__________ 10. Degree of Preparation--(comments)______________________________

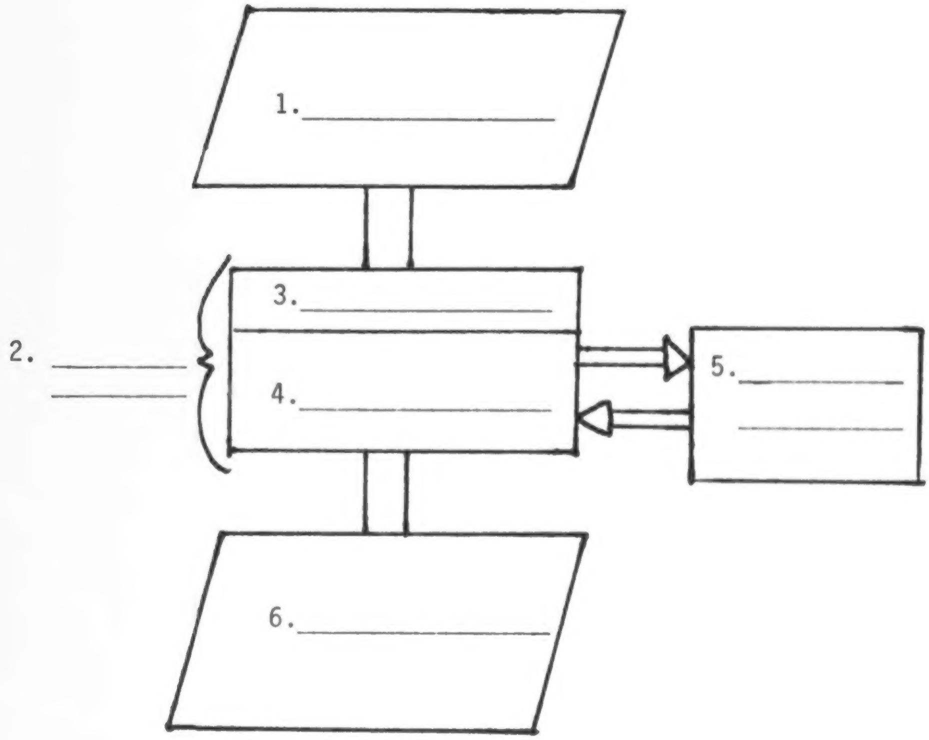
__________TOTAL POINTS EARNED __________GRADE EARNED

UNIT TEST

COMPUTER SYSTEMS

A. COMPUTER COMPONENTS

Directions: Label the numbered parts of a computer system.



B. SHORT ANSWER

Directions: Briefly explain the function of each of the following items.

1. Input____
2. CPU____
3. Memory____
4. Output____

C. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents your answer in the space next to each question.

Column A

_____ 1. A computer system which has smaller computer storage, slower processing speeds, and lower cost than large computer systems.

_____ 2. The heart of the computer system.

_____ 3. A low-cost storage that is used widely with minicomputers and microcomputers.

_____ 4. A plastic tape having a magnetic surface for storing data electronically.

Column B

A. Arithmetic operations
B. Auxiliary storage devices
C. Central Processing Unit
D. COM
E. CRT
F. Floppy disk
G. Magnetic disk
H. Magnetic drum
I. Magnetic tape
J. Main Computer Storage

UNIT TEST continued

_____ 5. A method used in the banking industry for encoding checks using a magnetic ink that can be sensed.

_____ 6. A device which is connected to the computer system and which can prepare printed reports under the control of a computer program.

_____ 7. The performing of calculations on data in the central processing unit.

_____ 8. A piece of cardboard capable of storing data in the form of punched holes recorded in the predefined areas.

_____ 9. A kind of memory in which transistors etched on crystals of silicon are used as a storage device.

_____10. Devices, generally magnetic tape and magnetic disk, on which data can be stored for use by computer programs; known as secondary storage.

_____11. A kind of memory in which data can be written into and read from for processing.

_____12. Recording output from a computer as a very small image on a sheet of film.

_____13. A kind of memory in which the contents can be read but cannot be altered when used as a part of a computer system.

K. Mainframe computer

L. MICR

M. Microcomputer

N. Minicomputer

O. Printer

P. Punched cards

Q. RAM

R. ROM

S. Semiconductor memory

T. Supercomputer

_____14. A peripheral storage device consisting of a cylinder or a drum.

_____15. The fastest memory that is directly connected to the CPU.

_____16. The largest, fastest, and most expensive computer available such as the CRAY-1.

_____17. A form of auxiliary storage in which data is stored on a rotating disk.

_____18. Large computers capable of processing large amounts of data at very fast speeds.

_____19. An electronic tube with a screen upon which information may be displayed.

_____20. A small, low cost computer.

D. TRUE/FALSE

Directions: Write T for true or F for false in the blank space next to each statement.

_____ 1. Magnetic disk storage is sometimes called secondary storage.

_____ 2. One advantage magnetic disk has over magnetic tape is that magnetic disk provides direct or random access to data.

_____ 3. The CRT is the world's most powerful computer system with the ability to process 80 million instructions per second.

_____ 4. The processor unit consists of the central processing unit and output unit.

_____ 5. Supercomputers are being used in schools today.

UNIT TEST continued

_____ 6. The computer system can perform two basic operations: input operations and output operations.

_____ 7. The data stored in main computer storage is processed under the control of a computer program.

_____ 8. The two most popular output devices are the CRT terminal and the printer.

_____ 9. One of the important features of any computer system is the ability to perform calculations at a very rapid rate.

_____10. The major advantage of sequential access is that any record in a file can be retrieved rapidly.

_____11. Data to be accessed randomly must be referenced by some control key.

_____12. Random access can only take place on direct access devices.

_____13. Random access is normally used with relative files.

_____14. The CRT terminal can be used only as input.

_____15. The computer program is stored first in the CPU and is brought into the auxiliary storage bin to process the information.

E. ESSAY

Directions: Discuss each item using complete sentences.

1. List and briefly explain the steps that occur when a computer system executes an instruction.

2. Compare the four types of computer systems based on descriptions of cost, size, and uses.

3. Describe what happens to the data during each of the following operations.

   a. Input

   b. Processing

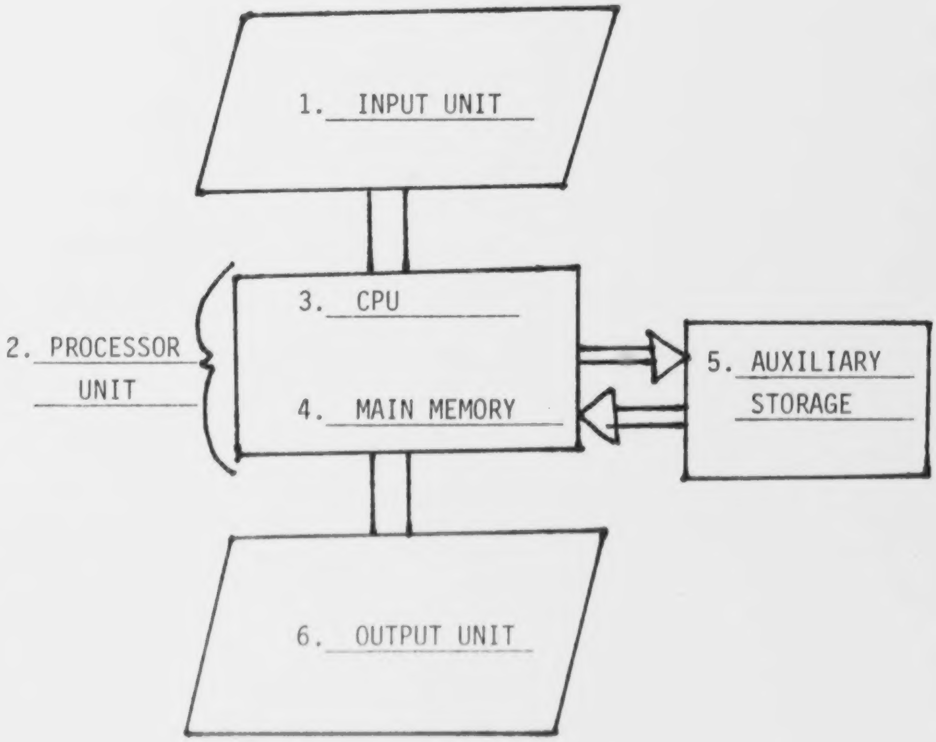
   c. Output

UNIT TEST

ANSWER KEY

A. COMPUTER COMPONENTS

Directions: Label the numbered parts of a computer system.


1. INPUT UNIT
2. PROCESSOR UNIT
3. CPU
4. MAIN MEMORY
5. AUXILIARY STORAGE
6. OUTPUT UNIT

UNIT TEST continued

B. SHORT ANSWER

Directions: Briefly explain the function of each of the following items.

1. Input is a representation of facts, concepts or instructions in a formalized manner suitable for communications, interpretation, and processing.
2. CPU heart of the computer system. Contains the electronic circuitry which actually causes processing to occur on the computer.
3. Memory consists of components which electronically store data.
4. Output information produced by transferring data stored in main computer memory to a device which can be used by people.

C. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents your answer in the space next to each question.

Column A

N 1. A computer system which has smaller computer storage, slower processing speeds, and lower cost than large computer systems.

C 2. The heart of the computer system.

F 3. A low-cost storage that is used widely with minicomputers and microcomputers.

Column B

A. Arithmetic operations

B. Auxiliary storage devices

C. Central Processing Unit

D. COM

E. CRT

F. Floppy disk

G. Magnetic disk

H. Magnetic drum

UNIT TEST continued

I 4. A plastic tape having a magnetic surface for storing data electronically.

L 5. A method used in the banking industry for encoding checks using a magnetic ink that can be sensed.

O 6. A device which is connected to the computer system and which can prepare printed reports under the control of a computer program.

A 7. The performing of calculations on data in the central processing unit.

P 8. A piece of cardboard capable of storing data in the form of punched holes recorded in the predefined areas.

S 9. A type of memory in which transistors etched on crystals of silicon are used as a storage device.

B 10. Devices, generally magnetic tape and magnetic disk, on which data can be stored for use by computer programs; known as secondary storage.

Q 11. A type of memory in which data can be written into and read from for processing.

D 12. Recording output from a computer as a very small image on a sheet of film.

I. Magnetic tape

J. Main Computer Storage

K. Mainframe computer

L. MICR

M. Microcomputer

N. Minicomputer

O. Printer

P. Punched cards

Q. RAM

R. ROM

S. Semiconductor memory

T. Supercomputer

UNIT TEST continued

R 13. A kind of memory in which the contents can be read but cannot be altered when used as a part of a computer system.

H 14. A peripheral storage device consisting of a cylinder or a drum.

J 15. The fastest memory that is directly connected to the CPU.

T 16. The largest, fastest, and most expensive computer available such as the CRAY-1.

G 17. A form of auxiliary storage in which data is stored on rotating disk.

K 18. Large computers which are capable of processing large amounts of data at very fast speeds.

E 19. An electronic tube with a screen upon which information may be displayed.

M 20. A small, low cost computer.

D. TRUE/FALSE

Directions: Write T for true or F for false in the blank space next to each statement.

T 1. Magnetic disk storage is sometimes called secondary storage.

T 2. One advantage magnetic disk has over magnetic tape is that magnetic disk provides direct or random access to data.

F 3. The CRT is the world's most powerful computer system with the ability to process 80 million instructions per second.

F 4. The processor unit consists of the central processing unit and output unit.

F 5. Supercomputers are being used in schools today.

F 6. The computer system can perform two basic operations: input operations and output operations.

T 7. The data stored in main computer storage is processed under the control of a computer program.

T 8. The two most popular output devices are the CRT terminal and the printer.

T 9. One of the important features of any computer system is the ability to perform calculations at a very rapid rate.

F 10. The major advantage of sequential access is that any record in a file can be retrieved rapidly.

T 11. Data to be accessed randomly must be referenced by some control key.

T 12. Random access can only take place on direct access devices.

T 13. Random access is normally used with relative files.

F 14. The CRT terminal can be used only as input.

F 15. The computer program is stored first in the CPU and is brought into the auxiliary storage bin to process the information.

E. ESSAY

Directions: Discuss each item using complete sentences.

1. List and briefly explain the steps that occur when a computer system executes an instruction.

   a. Instruction is obtained by the control unit and placed in a register.
   b. Data is obtained and placed in registers available to the arithmetic/logic unit.
   c. Instruction is executed by the arithmetic/logic unit.
   d. The answer is placed in main computer storage by the control unit.

2. Compare the four types of computer systems based on descriptions of cost, size, and uses.

   a. Mainframe computers
      Size--Large computers; 512K to several million characters; rapid processing speeds
      Approximate cost--$100,000 and up
      Uses--large businesses, government, timesharing
   b. Minicomputers
      Size--Computer system with smaller computer storages; slower processing speeds; 64K to 1MB; 32 bit microprocessor
      Approximate cost--$10,000 to $100,000
      Uses--businesses, office automation, scientific, engineering
   c. Microcomputers
      Size--16K to 512K; 8 bit, 12 bit, 16 bit microprocessors; limited storage based upon microprocessor
      Approximate cost--Under $10,000
      Uses--home, personal, small business, education
   d. Supercomputers (maxicomputers)
      Size--Enormous, sophisticated computers; process vast amounts of data and perform millions of calculations per second
      Approximate cost--$4.5 million or more
      Uses--scientific, government agencies, large corporations

3. Describe what happens to the data during each of the following operations.

   a. Input--This operation presents data to the processing unit of the computer system for processing of the data.

   b. Processing--This operation stores the data in the main computer storage before it can be processed. The data stored in the main computer storage can be referenced by the central processing unit so that processing can occur.

   c. Output--This operation can display, print, or make available the results of the processing of the data.

EVALUATION AND TESTING

Ways to Evaluate Pupil Growth

- Class notebook
- Class participation
- Oral report
- Project
- Unit test
- Written report

EQUIPMENT AND SUPPLIES

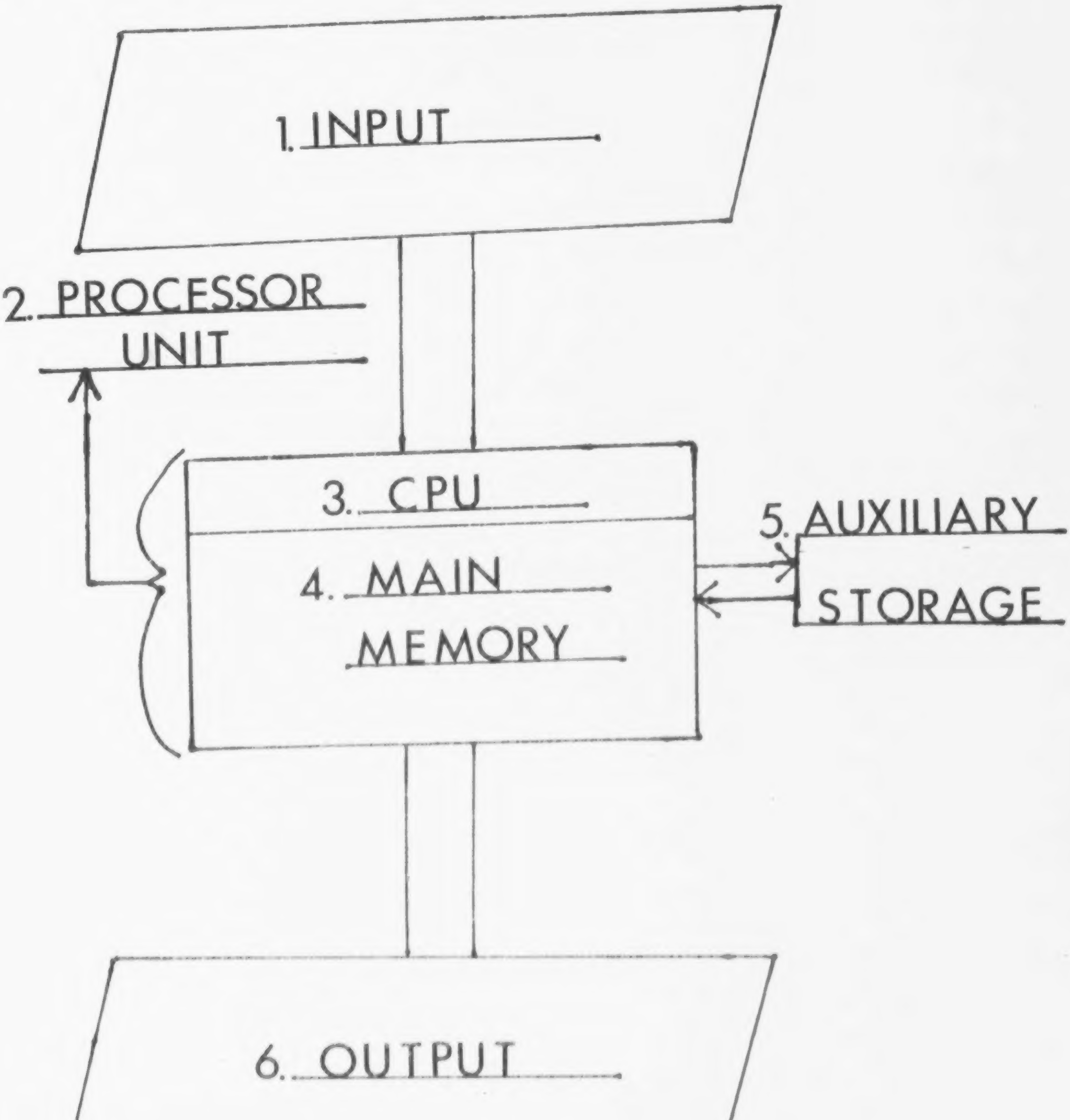
Student

Textbook
Notebook
Newspapers
Magazines
Bulletin Board Supplies

Teacher

Textbook and Manual
Overhead Projector
Transparencies
Film/Filmstrip Projector
Films and Filmstrips
Bulletin Board Supplies
Checklists
Periodicals

COMPONENTS OF A COMPUTER SYSTEM


1. INPUT
2. PROCESSOR UNIT
3. CPU
4. MAIN MEMORY
5. AUXILIARY STORAGE
6. OUTPUT

THE KINDS OF COMPUTER SYSTEMS

MAINFRAME COMPUTER

Size ___ ___ ___ ___ ___

Cost ___ ___ ___ ___ ___

Use ___ ___ ___ ___ ___

MINICOMPUTER

Size ___ ___ ___ ___ ___

Cost ___ ___ ___ ___ ___

Use ___ ___ ___ ___ ___

MICROCOMPUTER

Size ___ ___ ___ ___ ___

Cost ___ ___ ___ ___ ___

Use ___ ___ ___ ___ ___

SUPERCOMPUTER

Size ___ ___ ___ ___ ___

Cost ___ ___ ___ ___ ___

Use ___ ___ ___ ___ ___

SUPPLEMENTARY MATERIALS

Films (16mm)

Data Processing--A Series (1969)
Sterling Educational Films
241 E. 24th Street
New York, NY 10016

Direct Access Storage (1969)
Computer Methods Corporation
866 Third Avenue
New York, NY 10022

First Look at Computers (1973)
Du Page College, Learning Resource Center
22nd Street and Lambert Road
Glenn Ellyn, IL 60137

Filmstrips/Cassettes

Central Processor, The
Prismatron Productions, Inc.
155 Buena Vista Avenue
Mill Valley, CA 94941

Computer, The
Prismatron Productions, Inc.
155 Buena Vista Avenue
Mill Valley, CA 94941

Computer Components DX1081.
(Four color filmstrips, four cassettes, program guide; 1985)
Prentice-Hall Media
ServCode DX,
150 White Plain Road
Tarrytown, NY 10591

Getting Acquainted with Computers 075
(Filmstrip with Cassette Tape, 1981)
Bergwall
P. O. Box 238
Garden City, NY 11530-0238
800-645-3565

Getting to Know Micros 1089.90
(Filmstrip with Cassette Tape, 1983)
Prentice Hall Media
150 White Plains Road
Tarrytown, NY 10591

SUPPLEMENTARY MATERIALS continued

Guide to Microcomputing (Series) 079-B4.
(Four filmstrips with four cassettes and study guide), 1984.
Bergwall
P. O. Box 238
Garden City, NY 11530-0238
800-645-3565

Input and Output Units
Prismatron Productions, Inc.
155 Buena Vista Avenue
Mill Valley, CA 94941

Introduction to Data Processing. Volume I and Volume II Sound
Filmstrips (J527-1 and J527-2) (Four Filmstrips and Four
Cassettes in each set)
South-Western Publishing Company
11310 Gemini Lane
Dallas, TX 75229

Secondary Storage
Prismatron Productions, Inc.
155 Buena Vista Avenue
Mill Valley, CA 94941

Periodicals

Business Education World
McGraw-Hill
1221 Avenue of the Americas
New York, NY 10020

DATAMATION
875 Third Avenue
New York, NY 10022

80 Micro
Subscription Department
P. O. Box 981
Farmingdale, NY 11737

Modern Office Technology
P. O. Box 95795
Cleveland, OH 44101

Office, The
Office Publications, Inc.
1600 Summer Street
Stamford, CT 06904

PC Products
P. O. Box 17270
Denver, CO 80217

Popular Computing
Subscriber Service
P. O. Box 328
Hancock, NH 03449

Software News
P. O. Box 542
Winchester, MA 01890

T.H.E. Journal
Circulation Department
P. O. Box 364
Arlington, MA 02174

Simulations

Muscat, Eugene, and Paul Lorton, Jr. Microcomputer Applications for the Data Processing Work Kit, 1983.
McGraw-Hill Book Company
S1
Hightstown/Princeton Road
Hightstown, NJ 08520

Robichaud, B., E. Muscat, and A. M. Hall. Data Processing Work Kit, 1983, 2nd Edition.
McGraw-Hill Book Company
S1
Hightstown/Princeton Road
Hightstown, NJ 08520

Slides/Cassettes

Concepts of Data Processing
MPC Educational Publishers, (1983)
3839 White Plains Road
Bronx, NY 10467

Software

Simulated Computer.
(Available for Apple II, Apple IIe, and TRS-80 Model 1, III, and IV.)
Career Aids, Inc.
20417 Nordhoff Street, Dept U
Chatsworth, CA 91311

SUPPLEMENTARY MATERIALS continued

Transparencies

Computer Literacy (CL-345T) 1983
National Instructional Systems, Inc.
P. O. Box 1177
Huntington Beach, CA 92647
(714) 968-3700

Introduction to Computers and Data Processing Transparencies (J526)
South-Western Publishing Company, 1985
5101 Madison Road
Cincinnati, OH 45227

Videotapes

Audio Visual Library of Computer, The Education
The Computer, Understanding Computers, Microcomputers, Input and Output Units, Secondary Storage, The Central Processor, and Computer Numbers, 1984.
(Sound/Slide, Sound/Filmstrip and Videocassette)
Prismatron Productions, Inc.
155 Buena Vista Avenue
Mill Valley, CA 94941
(415) 383-0449

Central Processor
Prismatron Productions, Inc.
155 Buena Vista Avenue
Mill Valley, CA 94941
(415) 383-0449

Computers at Work: Concepts and Applications (Complete Series) 1984.
Lansford Publishing Company, Inc.
1088 Lincoln Avenue
P. O. Box 8711
San Jose, CA 95155
(408) 287-3105

RESOURCES

Arnold, R. R., H. C. Hill, and V. Nichols. *Modern Data Processing*. 2nd ed. New York: John Wiley and Sons, Inc., 1972.

Atkinson, June St. Clair. *Help With Computer Literacy*. Boston: Houghton Mifflin Company, 1984.

Ball, Marion J. *What Is a Computer?* Boston: Houghton Mifflin Company, 1983.

Clark, James, and Judith Lambrecht. *Information Processing*. Cincinnati: South-Western Publishing Company, 1985.

Data Processing Management Association. *Secondary Curriculum on Information Technology and Computer Information System*. Park Ridge, IL: Data Processing Management Association, 1984.

Gore, M. R., and J. W. Stubbe. *Computers and Information Systems*. 2nd ed. Hightstown, NJ: McGraw-Hill Book Company, 1984.

Hofeditz, C. A. *Computers and Data Processing Made Simple*. Garden City, NJ: Doubleday and Company, Inc., 1979.

Louisiana State Department of Education. *Computer Literacy Curriculum Guide*. Bulletin 1739. Baton Rouge: Louisiana State Board of Elementary and Secondary Education, 1984.

National Information Center for Educational Media (NICEM). *Index to 16mm Educational Films*. 7th ed. University of Southern California, 1980.

Orelia, L. S. *Introduction to Business Data Processing*. 2nd ed. Hightstown, NJ: McGraw-Hill Book Company, 1982.

Richman, Ellen. *Spotlight on Computer Literacy*. New York: Random House School Division, 1982.

Shelly, Gary, and Thomas Cashman. *Computer Fundamentals for an Information Age*. Brea, CA: Anaheim Publishing Company, Inc., 1984.

Shelly, Gary, and Thomas Cashman. *Introduction to Computers and Data Processing*. Brea, CA: Anaheim Publishing Company, Inc., 1980.

Verzello, R. J., and J. Reutter III. *Data Processing Systems and Concepts*. Hightstown, NJ: McGraw-Hill Book Company, 1982.

Wanous, S. J., Gerald E. Wagner, and Judith J. Lambrecht. *Fundamentals of Data Processing*. Cincinnati: South-Western Publishing Company, 1981.

RESOURCES continued

Wood, Merle W. Computer, People, Data. Cincinnati: South-Western Publishing Company, 1972.

Wood, Merle W. You Are a Data Processor. Cincinnati: South-Western Publishing Company, 1972.

UNIT VI

DATA PROCESSING RELATED CAREERS

INTRODUCTION

Individuals that should obviously benefit from the ever increasing use of computers are the hundreds of thousands of people working in computer installations or in data processing related fields. Help wanted ads in local newspapers and in nationally distributed computer periodicals attest to the demand for qualified people to fill the many vacancies.

This unit has been designed to enable students to explore data processing related careers as well as their own abilities and interests in regard to those careers.

COMPETENCIES

1. Identify career opportunities in data processing.
2. Examine potential career interests.

GENERAL PERFORMANCE OBJECTIVES/GOALS

1. Analyze career opportunities in data entry, data processing operations, systems analysis, programming, systems maintenance, marketing and computer-related services, and data processing management.
2. Appraise a potential career based upon present and future job availability, economic conditions, and student interest and ability.

SPECIFIC PERFORMANCE OBJECTIVES AND MASTERY CRITERIA

1. In class, students will be able to list at least four careers in data processing.
2. In an oral report, students will be able to analyze the advantages and disadvantages of data processing careers. Performance will be evaluated with the use of a checklist to be provided.
3. Given a list of data processing job titles on a written test, students will be able to describe the major task performed on each job with at least 75 percent accuracy.

4. Students will be able to compare and contrast various career ladders in the data processing field.

5. On a written test, students will be able to describe at least three past and at least three future trends in data processing jobs.

6. On a written test, students will be able to provide five sources of information on data processing and related careers.

7. Students will be able to set priorities and justify a possible personal career preference (data processing related) in a written report.

METHODOLOGY

The purpose of this unit is to present information for the field of data processing and related careers as it relates to present and future job availability, economic conditions, and student interest and abilities.

Methods of teaching to be employed include lectures, audiovisual aids, individual research, reports, field trips, question/answer sessions, and games to reinforce learning.

The supplementary materials section of this unit may be used to gather information needed.

SUGGESTED INTEREST APPROACHES

1. Cut out and display a collection of newspaper advertisements for data processing and related careers.

2. Interview a former graduate who is now employed at a data processing center to discuss education and training, skills needed, and experience required in the data processing field and related careers.

3. Invite a data processing operator or manager to explain the operation of a data processing center and the duties of various job categories.

4. View a film on data processing and related careers.

5. Take a field trip to a data processing center.

UNIT OUTLINE

DATA PROCESSING RELATED CAREERS

I. Data Processing Jobs and Tasks

- A. Data-entry
    1. card-punch operator
    2. data-entry operator
    3. on-line terminal operator
- B. Data processing operations
    1. computer operator
    2. peripheral equipment operator
    3. punch-card equipment operator
    4. burster/decollator operator
    5. computer operations trainee
- C. System analysts
    1. system analyst
    2. equipment analyst
- D. Programming
    1. systems programmer
    2. senior computer programmer
    3. junior computer programmer
    4. programming trainee
- E. Systems maintenance
    1. equipment technician
    2. equipment analyst
    3. maintenance programmer
- F. Marketing and computer-related services
    1. input/output control clerk
    2. scheduling coordinator
    3. sales representative
    4. sales manager
    5. sales/technical support representative
    6. software support specialist
- G. Data processing management
    1. computer supervisor
    2. data processing manager
    3. data base administrator

II. Data Processing Career Selection

- A. Present and future job availability
- B. Economic conditions
- C. Student interests and abilities
- D. Educational requirements

SPECIFIC PERFORMANCE OBJECTIVES AND LEARNING ACTIVITIES

---

1. In class, students will be able to list at least four careers in data processing.

Subject Matter Content	Learning Activities
Data Processing Jobs and Tasks	1. Complete the scrambled word exercise reviewing data processing and related career terms. (Appendix A) 2. Discuss jobs made available by data processing and related careers. 3. Prepare a bulletin board using career titles made available by data processing and related careers. 4. Complete a word search puzzle of data processing careers. (Appendix B)

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2. In an oral report students will be able to analyze the advantages and disadvantages of data processing careers. Performance will be evaluated with the use of a checklist to be provided.

Subject Matter Content	Learning Activities
Data Processing Career Selection	1. Research advantages and disadvantages of data processing jobs and prepare an oral report to present to the class. (Appendix C) 2. Debate the pros and cons on choosing a data processing or related career. 3. Compare local data processing salaries with national averages. (Appendix D)

4. Interview a data processing employee to determine job tasks, salary, advancement opportunities, and work hours.

5. Present findings to the class.

---

3. Given a list of data processing job titles on a written test, students will be able to describe the major task performed on each job with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Data Processing Jobs and Tasks	1. Prepare a report of job titles and the tasks performed on each job. 2. Complete a chart illustrating job titles and tasks performed. (These charts will be prepared in groups.) 3. Interview data processing employees to determine their job titles and tasks performed.

---

4. Students will be able to compare and contrast various career ladders in the data processing field.

Subject Matter Content	Learning Activities
Data Processing Career Selection	1. Observe posters prepared by teacher or previous class on career ladders in data processing and related careers. 2. Organize a notebook on career paths. Notebooks might include pictures, illustrations, job titles, and promotions. 3. Discuss career ladder options illustrated in a typical data processing organization chart. (Appendix E) 4. Complete a form illustrating a career ladder for data processing and related careers. (Appendix F)

---

5. On a written test, students will be able to describe at least three past and at least three future trends in data processing jobs.

Subject Matter Content	Learning Activities
Data Processing Career Selection	1. Interview a manager or supervisor in data processing or related career to determine past and future job trends. 2. Prepare a report on the past and future trends in data processing and related careers. 3. Conduct a question and answer session on past and future trends in data processing and related careers. 4. Determine the current number of job opportunities in data processing available in the local area. (Appendix G)

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6. On a written test, students will be able to provide five sources of information on data processing and related careers.

Subject Matter Content	Learning Activities
Data Processing Career Selection	1. Visit the school guidance office to collect information on data processing and related careers. 2. Write to various universities, vocational/technical schools, and businesses to acquire information on the training each offers in the area of data processing. 3. Contact the nearest chapter of a data processing association to obtain career information. 4. Compile a list of possible career information sources as a small group activity.

5. Contribute the group's findings to a full class discussion.

---

7. Students will be able to set priorities and justify a possible personal career preference (data processing related) in a written report.

Subject Matter Content	Learning Activities
Data Processing Career Selection	1. Discuss the education, training, and skills needed for various data processing jobs. 2. Complete an interests inventory. (Appendix H) 3. Complete an abilities and skills inventory. (Appendix I) 4. Write a report justifying a possible data procesing career preference. 5. Make an oral presentation of the report to the class.

APPENDIX A

SCRAMBLED WORDS

Directions: Unscramble the following words:

1. roteparo ______________________________
2. merprogarm ______________________________
3. netraie ______________________________
4. tadomintarris ______________________________
5. lanayts ______________________________
6. noarrocotid ______________________________
7. chintecani ______________________________
8. rutopcem ______________________________
9. tada ______________________________
10. gopcrisens ______________________________

APPENDIX A

ANSWER KEY

Directions: Unscramble the following words:

1.	roteparo	operator
2.	merprogarm	programmer
3.	netraie	trainee
4.	tadomintarris	administrator
5.	lanayts	analyst
6.	noarrocotid	coordinator
7.	chintecani	technician
8.	rutopcem	computer
9.	tada	data
10.	gopcrisens	processing

APPENDIX B

DATA PROCESSING AND RELATED CAREERS WORD FIND

M	O	S	P	O	I	L	X	R	S	A	C	C	O	U	N	T	I	N	G	C	L	E	R	K	F	:	I
R	A	S	R	E	E	S	Y	R	A	B	A	L	P	U	A	O	O	E	O	P	C	I	O	E	:	P	O
O	P	I	P	O	W	O	B	N	R	S	W	E	O	E	P	A	L	M	N	W	P	A	E	I	D	S	T
R	O	O	L	P	E	E	E	D	E	D	E	C	T	K	R	E	L	C	M	L	I	F	O	R	C	I	M
E	E	E	W	C	E	R	D	D	A	R	W	K	R	R	E	E	S	O	T	T	O	A	A	O	O	F	C
V	T	A	T	W	L	V	H	A	D	F	W	T	N	E	U	E	R	M	Y	Q	W	S	S	W	W	D	A
U	I	D	I	Y	I	E	C	A	U	N	W	Y	D	D	F	C	V	P	N	W	E	D	D	E	D	W	L
I	O	I	R	Y	R	T	R	W	F	I	G	P	V	C	B	B	R	U	F	E	R	F	F	R	P	C	C
E	C	H	V	T	Y	O	H	K	E	F	H	I	O	B	F	C	F	T	S	R	T	G	G	T	G	I	U
P	V	P	I	O	J	H	D	D	N	D	K	S	O	J	B	N	V	E	C	T	Y	G	H	Y	V	O	L
E	E	Y	O	I	R	U	J	E	K	S	L	T	X	F	N	H	J	R	B	Y	U	H	J	U	P	N	A
F	I	L	F	C	L	E	R	K	A	B	O	E	Z	E	W	J	G	O	D	U	I	J	K	H	M	B	T
E	N	E	N	Y	D	M	D	D	G	D	Y	D	C	V	X	N	K	P	Y	U	O	J	U	G	J	E	I
A	P	R	O	G	R	A	M	M	I	N	G	T	R	A	I	N	E	E	V	I	P	K	Y	F	F	R	N
E	U	B	R	E	D	N	R	U	D	D	D	C	V	V	O	A	E	R	B	O	I	I	T	D	Y	C	G
I	T	H	A	T	U	A	E	K	B	J	I	B	B	N	V	C	G	A	H	O	K	M	R	S	I	X	M
V	O	H	E	D	D	G	I	G	D	H	I	N	M	C	F	B	V	T	T	P	H	N	E	X	:	N	A
K	U	J	T	E	D	E	G	D	H	A	E	E	N	X	F	B	B	O	C	A	J	B	E	C	G	C	C
E	T	A	Y	U	I	R	D	M	E	F	D	U	L	M	W	T	E	R	B	S	G	V	W	Y	:	V	H
G	P	S	V	E	J	R	E	R	C	R	H	S	U	I	O	M	G	T	W	D	F	C	W	B	S	R	I
J	U	O	B	B	B	W	F	S	Y	S	T	E	M	A	N	A	L	Y	S	I	S	X	O	B	C	O	N
D	T	U	E	N	C	F	F	U	S	Q	V	V	O	B	N	F	G	C	C	F	A	Z	R	N	Y	X	E
W	C	E	I	I	R	R	E	O	U	I	P	M	E	N	T	A	N	A	L	Y	S	T	S	M	B	V	O
B	L	M	O	I	W	E	I	J	S	E	N	G	F	B	N	B	K	B	P	G	Z	R	V	A	J	N	P
R	E	P	E	E	K	M	E	K	V	D	O	G	G	F	W	J	O	E	S	M	Z	B	B	S	N	B	E
G	R	R	T	G	F	M	M	L	J	K	W	D	M	U	X	T	G	N	N	J	C	N	N	O	M	V	R
E	K	H	Y	K	G	A	K	S	A	D	O	M	O	A	Y	U	P	U	M	K	V	M	M	F	G	C	A
O	E	D	C	E	F	R	D	C	E	H	I	O	B	V	C	I	B	L	V	J	B	U	Z	G	B	C	T
Y	T	R	B	D	R	G	F	B	E	D	P	U	C	G	F	H	Y	D	X	L	N	F	X	H	M	J	O
C	I	U	N	K	V	O	K	N	W	F	L	N	B	I	S	S	I	O	Z	Z	M	S	C	B	O	M	R
L	C	W	D	V	Y	R	S	V	S	B	N	G	M	M	S	E	R	N	R	X	M	C	V	H	W	O	E
R	M	G	K	D	E	P	W	M	J	E	R	N	Z	F	I	C	Y	A	E	C	P	N	V	J	O	P	C
I	N	K	S	M	O	R	R	W	V	O	J	Y	E	B	E	K	M	C	T	O	I	M	B	N	Y	T	V
D	O	S	D	W	A	E	T	N	D	U	V	T	G	R	A	J	B	B	Y	V	P	K	B	K	M	R	B
W	R	G	S	R	E	T	H	O	B	G	Y	C	N	B	I	L	D	M	U	B	U	E	N	U	I	W	H
R	O	J	S	T	S	U	P	E	R	V	I	S	O	R	Y	D	C	J	M	B	Y	C	R	I	O	W	M
G	P	D	V	Y	I	P	U	F	D	D	V	S	Y	S	S	F	C	C	K	N	R	B	B	A	:	O	N
D	H	W	C	W	R	M	W	W	A	B	N	W	E	V	X	B	J	V	O	N	T	U	E	O	:	Y	W
H	N	Y	S	N	T	O	O	B	N	E	X	X	D	Y	B	K	D	X	P	M	E	V	E	P	E	O	S
Y	W	E	J	I	Y	C	J	M	Y	O	W	B	B	W	S	O	E	B	O	E	W	W	C	O	E	W	P

Mail Clerk
Accounting Clerk
Microfilm Clerk
File Clerk
Calculating Machine Operator
Equipment Analyst
Supervisor
Manager
Input-Output Clerk
Programming Trainee
Addressing Machine Operator
Computer Operator
System Analysis
Computer Programmer
Clerk Typist

APPENDIX B

ANSWER KEY

M	O	S	P	D	I	L	X	R	S	A	C	C	O	U	N	T	I	N	G	C	L	E	R	K	P	S	T
R	A	S	R	E	E	S	Y	R	A	B	A	L	P	U	A	O	O	E	O	P	C	I	O	E	A	M	O
O	P	I	P	O	W	O	B	N	R	S	H	E	O	F	P	A	I	M	N	W	P	A	E	I	R	S	T
R	O	O	L	P	E	E	E	D	E	D	F	R	T	K	R	E	L	C	M	L	I	F	O	R	C	I	M
F	E	E	W	C	E	R	D	D	A	R	W	K	R	R	F	E	S	O	T	T	O	A	A	O	Q	F	C
V	T	A	T	W	L	V	H	A	D	F	W	T	N	E	U	F	R	M	V	O	W	S	S	W	W	D	A
U	I	D	I	Y	I	E	C	A	U	N	W	Y	D	D	F	C	V	P	N	W	E	D	D	E	D	W	L
I	O	I	R	Y	R	T	R	W	F	I	G	P	V	C	B	R	R	U	F	E	R	F	F	R	R	C	C
E	C	W	V	T	V	D	H	K	E	F	H	I	O	B	F	C	F	T	S	R	T	G	G	T	G	I	U
P	V	P	I	D	J	H	D	D	N	D	K	S	D	J	B	N	V	E	C	T	Y	G	H	Y	V	O	L
E	E	Y	D	I	R	U	J	E	K	S	L	T	X	F	N	H	J	R	B	Y	U	H	J	U	B	N	A
F	I	L	E	C	L	E	R	K	A	B	O	E	Z	E	H	J	G	O	D	U	I	J	K	H	M	B	T
E	N	E	H	Y	D	M	D	D	G	D	Y	D	C	V	X	N	K	P	V	U	O	J	U	G	J	E	I
A	P	R	O	G	R	A	M	M	I	N	G	T	R	A	I	N	E	E	V	I	P	K	Y	F	F	R	N
E	U	B	R	E	D	N	R	U	D	D	D	C	V	V	O	A	E	R	B	O	L	L	T	D	V	C	G
I	T	H	A	T	U	A	E	K	B	J	I	B	B	N	V	C	G	A	H	O	K	M	R	S	L	X	M
V	O	H	E	D	D	G	I	G	D	H	I	N	M	C	F	B	V	T	T	P	H	N	E	X	J	W	A
K	U	J	T	E	D	E	G	D	H	A	E	E	N	X	F	B	B	O	C	A	J	B	E	C	G	C	C
E	T	A	Y	U	I	R	D	M	E	F	D	U	L	M	W	T	F	R	B	S	G	V	W	V	A	V	H
G	P	S	V	E	J	R	E	R	C	R	H	S	U	I	O	M	G	T	W	D	F	C	W	B	S	R	I
J	U	O	B	B	B	W	F	S	Y	S	T	E	M	A	N	A	L	Y	S	I	S	X	Q	B	C	O	N
D	T	U	E	N	C	F	F	U	S	R	V	V	O	B	N	F	G	C	C	F	A	Z	R	N	V	X	E
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B	L	M	O	I	W	E	I	J	S	E	N	G	F	B	N	B	K	B	P	G	Z	R	V	A	J	N	P
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G	R	R	T	G	F	M	H	L	J	K	W	D	M	U	X	T	G	N	N	J	C	N	N	D	M	V	R
E	K	H	Y	K	G	A	K	S	A	D	O	M	O	A	Y	U	P	U	M	K	V	M	M	F	G	C	A
O	F	D	C	E	F	R	D	C	E	B	I	O	B	V	C	I	B	L	V	J	B	U	Z	G	B	C	T
V	T	R	B	D	R	G	F	B	E	D	P	U	C	G	F	H	V	D	X	L	N	F	X	H	M	J	O
C	I	U	N	K	V	O	K	N	W	E	L	N	B	I	S	S	I	O	Z	Z	M	S	C	B	O	M	R
L	C	W	D	V	Y	R	S	V	S	B	N	G	M	M	S	E	R	N	R	X	M	C	V	H	W	O	E
R	M	G	K	D	E	P	W	M	J	E	R	N	Z	F	I	C	V	A	E	C	P	N	V	J	D	P	C
I	N	K	S	M	O	R	R	W	V	O	J	V	E	B	E	K	M	C	T	O	I	M	B	N	V	T	V
O	O	S	D	W	A	E	T	N	D	U	V	T	G	R	A	J	B	B	Y	V	P	K	B	K	H	R	B
W	R	G	S	R	E	T	H	O	B	G	Y	C	N	B	I	L	D	M	U	B	U	E	N	U	I	W	H
R	O	J	S	T	S	U	P	E	R	V	I	S	O	R	V	D	C	J	M	B	Y	C	R	I	O	W	M
G	P	D	V	Y	I	P	U	F	D	D	V	S	V	S	S	F	C	C	K	N	R	B	B	A	T	Q	N
D	W	W	C	W	R	M	W	W	A	B	N	W	E	V	X	B	J	V	O	N	T	U	E	O	T	X	W
H	N	Y	S	N	T	O	D	B	N	E	X	X	D	V	B	K	D	X	P	M	E	V	E	P	R	O	S
Y	W	E	J	I	Y	C	J	M	Y	O	W	B	B	W	S	O	E	B	Q	E	W	W	C	Q	F	W	R

APPENDIX C

ORAL REPORT CHECKLIST

Student's Name ______________________ Topic ______________

* 5 is the highest possible score in each category.

	0	1	2	3	4	5	COMMENTS
ORGANIZATION OF REPORT							
Introduction							
Body							
Conclusion							
BEHAVIOR AND MANNERISMS							
Eye Contact							
Facial Expression							
Posture and Gestures							
VOICE AND SPEECH							
Clarity							
Pronunciation							
Enunciation							
Grammar							
OVERALL PERFORMANCE							

Date ________________________ Total Points ______________

APPENDIX D

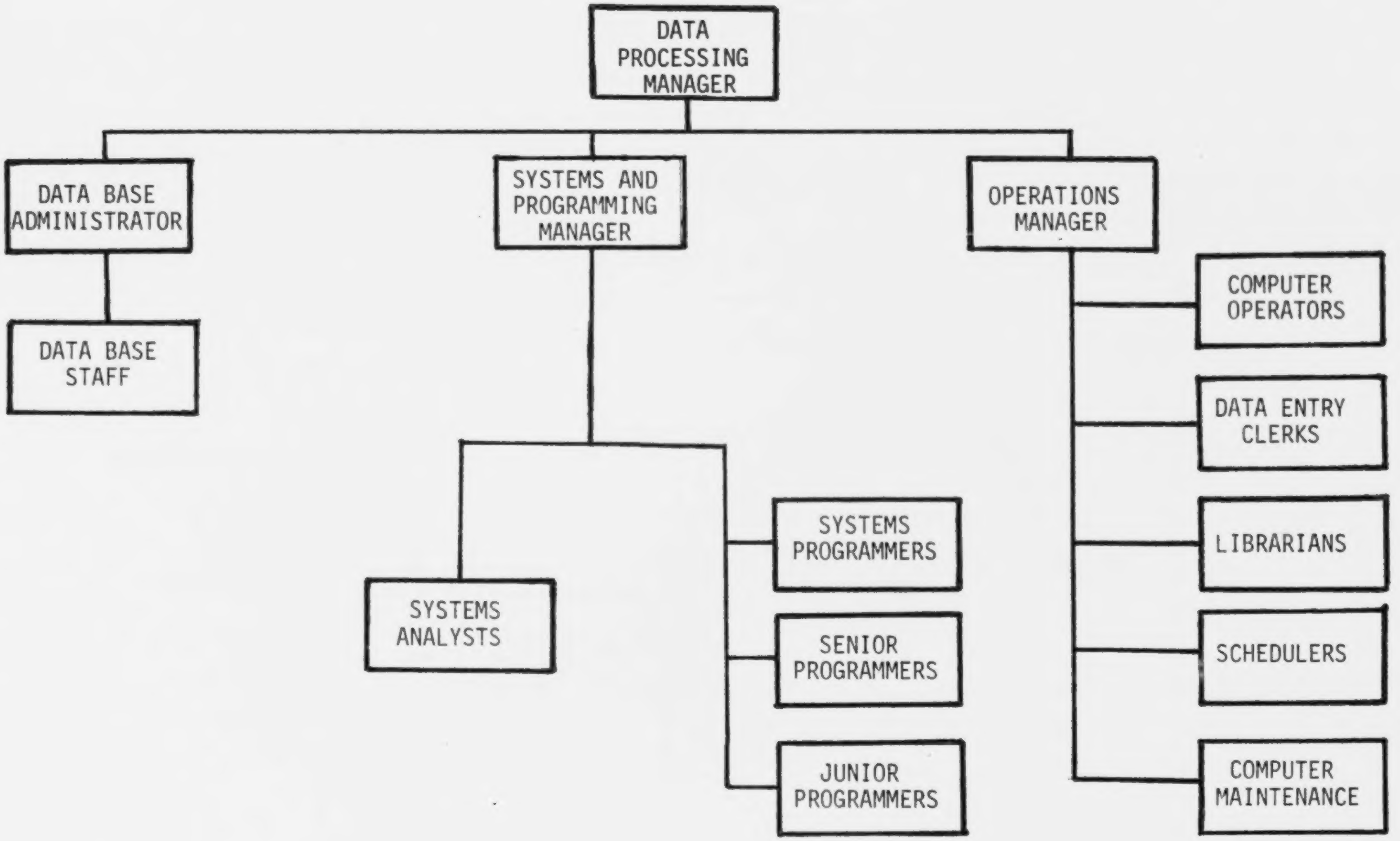
COMPARING SALARIES

Directions: Look for sources of information to find weekly salaries for the data processing jobs listed below. Find the average weekly pay in the area and compare it with national averages obtained from a data processing periodical.

	1983-84 Average U. S. Weekly Salary	Local Salary
Programmer Analyst		
Programmer		
Programmer Trainee		
Customer Service Engineer		
Data Clerk		
Data Entry Trainee		
Computer Operator		
Data Base Administrator		

APPENDIX E

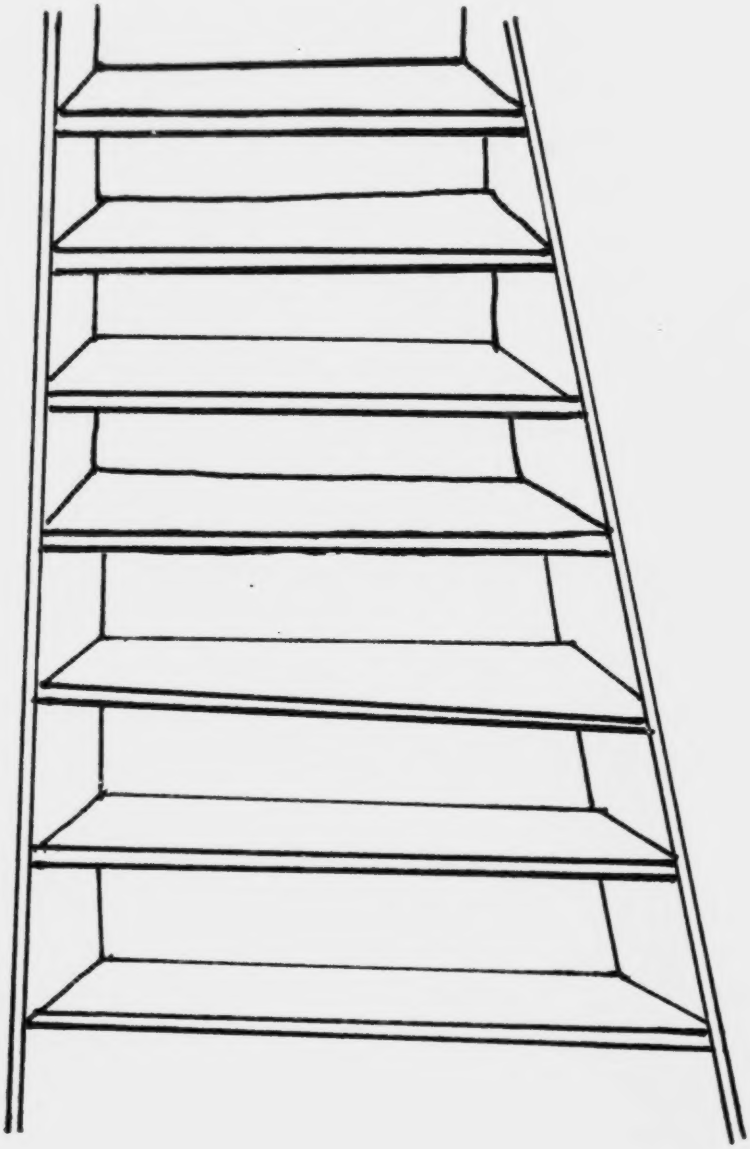
DATA PROCESSING ORGANIZATIONAL CHART


DATA PROCESSING MANAGER
DATA BASE ADMINISTRATOR
SYSTEMS AND PROGRAMMING MANAGER
OPERATIONS MANAGER
DATA BASE STAFF
COMPUTER OPERATORS
DATA ENTRY CLERKS
LIBRARIANS
SCHEDULERS
COMPUTER MAINTENANCE
SYSTEMS ANALYSTS
SYSTEMS PROGRAMMERS
SENIOR PROGRAMMERS
JUNIOR PROGRAMMERS

APPENDIX F

CAREER LADDER

Directions: On the following ladder, illustrate a vertical career path in data processing and related careers using job titles discussed in class. Indicate the path of your career goal with an arrow and end with the title of your career goal.



APPENDIX G

NUMBER OF JOB OPENINGS

Directions: Count the number of data processing job openings listed in local and out-of-town newspapers.

Job Title	Local Openings	Openings for Same State Different City	Openings for Different State and City
1.			
2.			
3.			
4.			
5.			

APPENDIX H

YOUR INTERESTS

Directions: Place a check in the section which describes things you might like to do.

	Definitely Yes	Perhaps	Definitely No	Not Sure
1. Operate equipment				
2. Work indoors				
3. Do some jobs over and over				
4. Sit for periods of time				
5. Be organized				
6. Work with numbers				
7. Have limited physical activity				
8. Do reports				

*If you have answered "Yes" or "Sometimes" to most of the questions, you show that you have some of the same interests as data processing workers. If you answered "Not Sure," you will need to explore the field of data processing more fully.

APPENDIX I

YOUR ABILITIES AND SKILLS

Directions: Place a check in the section which describes your abilities.

	YES	NO	NOT SURE
1. Operate keyboard machine			
2. Work under noisy conditions			
3. Use telephone properly			
4. Work at a job until it is finished			
5. Follow directions			
6. Work accurately when pushed for a deadline			
7. Meet deadlines			
8. Work independently			
9. Make decisions			
10. Handle stress			

*If you answered "YES" to most of the questions, you have some of the abilities and skills needed by data processing workers. If you answered "NOT SURE," it probably means you might want to take courses and do activities that will help you acquire those abilities and skills for data processing and related jobs.

UNIT TEST

DATA PROCESSING AND RELATED CAREERS

A. JOB TASKS

Directions: Describe the major task performed on each job.

Job Title	Tasks Performed
1. Data Entry Operator	
2. Computer Operator	
3. System Analyst	
4. Tape Librarian	
5. Programmer	

B. ESSAY

Directions: Discuss each item using complete sentences.

1. Discuss at least three past and three future trends in data processing and related careers.

2. List five sources of information for data processing and related careers.

UNIT TEST

ANSWER KEY

A. JOB TASKS

Directions: Describe the major task performed on each job.

Job Title	Tasks Performed
1. Data Entry Operator	Keys data to be processed
2. Computer Operator	Keys instructions into computer console, operates computer tapes
3. System Analyst	Finds best way to process data
4. Tape Librarian	Files computer tapes
5. Programmer	Writes instructions for data processing machines to follow

B. ESSAY

Directions: Discuss each item using complete sentences.

1. Discuss past and future trends in data processing and related careers.

   Answers will vary

2. Provide five sources of information for data processing and related careers.

   Answers will vary

EVALUATION AND TESTING

Ways to Evaluate Pupil Growth

- Class participation
- Class notebook
- Oral report
- Posters
- Unit test
- Word find
- Work sheets
- Written report

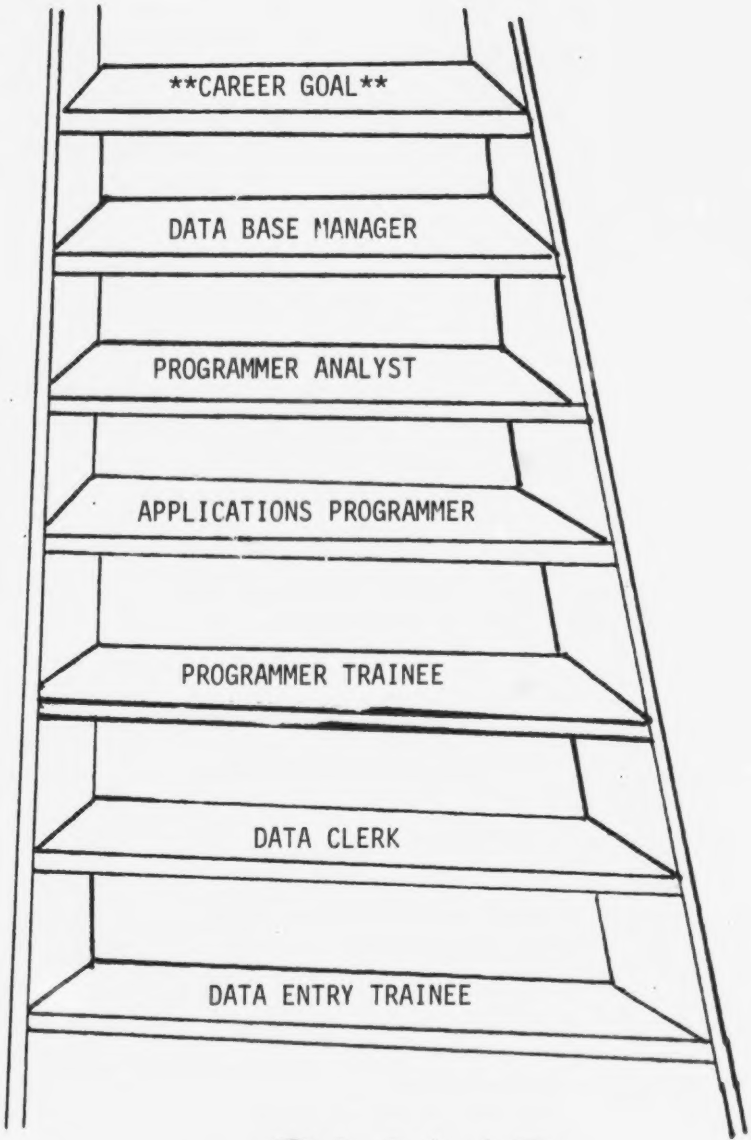
EQUIPMENT AND SUPPLIES

Student

Textbook
Checklists
Dictionary
Newspapers
Periodicals/Pamphlets
Posters
Notebook

Teacher

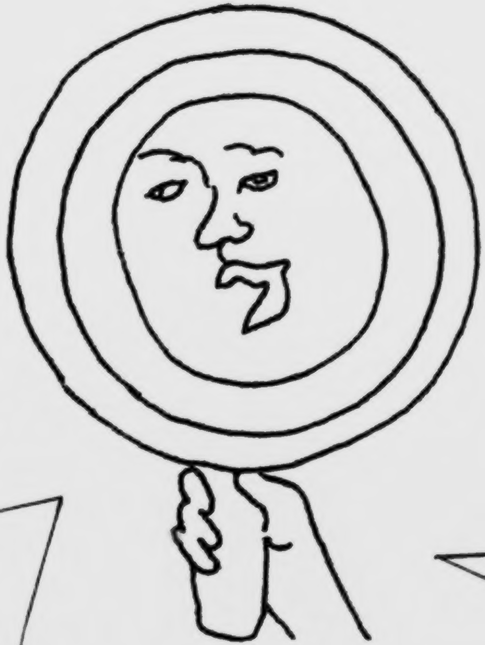
Textbook and Manual
Charts
Bulletin Board Materials
Pamphlets/Periodicals
Prepared Posters
Newspapers
Films
Filmstrip Projector
Checklists


CAREER GOAL
DATA BASE MANAGER
PROGRAMMER ANALYST
APPLICATIONS PROGRAMMER
PROGRAMMER TRAINEE
DATA CLERK
DATA ENTRY TRAINEE

CLIMB

THE LADDER OF SUCCESS
IN A
DATA PROCESSING CAREER

MIRROR! MIRROR! WHICH DATA PROCESSING CAREER IS FOR ME?



PROGRAMMING

SYSTEMS ANALYST

DATA ENTRY

MARKETING AND COMPUTER RELATED SERVICES

DATA PROCESSING OPERATIONS

SYSTEMS MAINTENANCE

DATA PROCESSING MANAGEMENT

SUPPLEMENTARY MATERIALS

Films

Kissing the Girls Goodbye
16MM, Color, 13 Min.
Information Center for Education Media
University of Southern California
University Park
Los Angeles, CA 90007

Take it From the Top
16MM, Color, 15 Min.
Information Center for Education Media
University of Southern California
University Park
Los Angeles, CA 90007

Filmstrips/Cassettes

Careers in Computers
(Programming Careers, Data Processing Careers,
Hardware Development and Service Careers,
and Peripheral Careers)
4 sound color filmstrips plus teacher's manual
Career Aids, Inc.
20417 Nordhoff Street, Dept. U
Chatsworth, CA 91311

Careers in Computing
1 sound color filmstrip
Career Aids, Inc.
20417 Nordhoff Street, Dept. U
Chatsworth, CA 91311

Careers in Data Processing
6 sound color filmstrips
Career Aids, Inc.
20417 Nordhoff Street, Dept. U
Chatsworth, CA 91311

Handbooks

The Computer Careers Handbook
Arco Publishing, Inc.
215 Park Avenue South
New York, NY 10003

SUPPPLEMENTARY MATERIALS continued

Pamphlets and Brochures (Sources)

American Federation of Information Processing Societies
1815 N. Lynn Street, Suite 800
Arlington, VA 22209

Association for Computing Machinery
11 West 42nd Street
New York, NY 10036

Association for Women in Computing
10701 Green Mountain Circle
Columbia, MD 21044

Association of Computer Programmers and Analysts
11800 Sunrise Valley Drive, Suite 808
Reston, VA 22091

Association of Information Systems Professionals
1015 North York Road
Willow Grove, PA 19090

Computer Career News
P.O. Box 1001
Oradell, NJ 07649

Data Processing Management Association
505 Busse Highway
Park Ridge, IL 60068

Society of Certified Data Processors
1835 Union Avenue, Suite 325
Memphis, TN 38104

U.S. Office of Education
400 Maryland Avenue, SW
Washington, DC 20202

Periodicals

Computerworld
375 Cochtuate Road
Framingham, MA 01701

Datamation
1801 S. LaCienega Blvd.
Los Angeles, CA 90035

Journal of Systems Management
Association for Systems Management
24587 Bagley Road
Cleveland, OH 44138

RESOURCES

Atkinson, June St. Clair. Help With Computer Literacy. Boston: Houghton Mifflin Co., 1984.

Carron, L. Peter. How to Break Into the Computer Field. Easton, PA: L.P. Carron Publishers, 1981.

Clark, James F., and Judith J. Lambrecht. Information Processing. Cincinnati: South-Western Publishing Co., 1985.

Dock, V. Thomas, and Edward L. Essick. Principles of Business Data Processing with MIS... Including BASIC. 4th ed. Chicago: Science Research Associates, Inc., 1981.

Koller, William. Your Career in Computer-Related Occupations. New York: Arco Publishing, Inc., 1979.

Kroenke, David M. Business Computer Systems. 2nd ed. Santa Cruz, CA: Mitchell Publishing, Inc., 1984.

Mainstream Access, Inc. The Data Processing/Information Technology Job Finder. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1981.

Mandell, Steven L. Computers and Data Processing. 3rd ed. New York: West Publishing Co, 1985.

Mcleod, Raymond Jr., and Irvine Forkner. An Introduction to Data Processing. New York: John Wiley & Sons, 1973.

Plevyak, Paul P., and Harry Bazzett. Accounting and Data Processing Careers. Cincinnati: South-Western Publishing Co., 1984.

Robichaud, Beryl, and Eugene Muscat. Introduction to Data Processing. 3rd ed. New York: Gregg Division McGraw-Hill Co., 1983.

Schnake, Marilyn A. The World of Computers and Data Processing. New York: West Publishing Co., 1985.

Stern, Robert A., and Nancy Stern. An Introduction to Computers and Information Processing. 2nd ed. New York: John Wiley & Sons, 1985.

UNIT VII

DATA PROCESSING FUNDAMENTALS

INTRODUCTION

The successful completion of Data Processing I provided students with a working knowledge of fundamental data processing concepts. In the second semester of Data Processing, students can broaden their understanding and further develop those skills necessary to function in the ever-changing technological world.

The purpose of this unit is to review the data processing fundamentals, to familiarize students with data communication, and to enhance their knowledge of microcomputers.

COMPETENCIES

1. Review data processing fundamentals.

2. Develop a broader knowledge of how a computer works.

3. Become familiar with data communication.

GENERAL PERFORMANCE OBJECTIVES/GOALS

1. Review the data processing cycle and the terms and basic principles of a computer system.

2. Develop a broader knowledge of the components of a microcomputer.

3. Understand and discuss the binary data coding system.

4. Distinguish among the types of data communication systems.

5. Describe types of data communication and important applications in business and in the home.

SPECIFIC PERFORMANCE OBJECTIVES AND MASTERY CRITERIA

1. On a written test, students will be able to define data processing terminology with at least 75 percent accuracy.

2. On a written test, students will be able to list and explain the steps in the data processing cycle with at least 75 percent accuracy.

3. Given a list of computer systems in class, students will be able to describe one of these computer systems.

4. In class, students will be able to identify the various name brands of microcomputers.

5. Students will be able to prepare a written report comparing and contrasting microcomputers. A checklist will be used for evaluation.

6. On a written test, students will be able to explain the main reason a binary system is used in main computer storage with at least 75 percent accuracy.

7. On a written test, students will be able to convert binary numbers to their decimal equivalents with at least 75 percent accuracy.

8. On a written test, students will be able to explain the difference between a bit, a byte, and a word with at least 75 percent accuracy.

9. On a written test, students will be able to list the major disadvantages and advantages of time-sharing with at least 75 percent accuracy.

10. In class, students will be able to discuss how computer time-sharing systems operate.

11. In class, students will be able to explain the different modes of transmission for data communication.

12. On a written test, students will be able to compare three channels of data communication with at least 75 percent accuracy.

13. On a written test, students will be able to list and describe types of networking with at least 75 percent accuracy.

14. Given statements related to computer systems on a written test, students will be able to identify whether the statements are true or false with at least 75 percent accuracy.

METHODOLOGY

The purpose of this unit is to review the data processing cycle and data processing applications. The unit will expand the fundamentals to include a more detailed coverage of the internal components of a computer and the binary numbering system. Students will also have an opportunity to learn about data communication and networking.

Periodicals, fields trips, audiovisual aids, and guest speakers will be used to enrich content covered in the teacher's lectures. Many of these activities and sources are listed in the learning activities and supplementary materials sections of this unit.

SUGGESTED INTEREST APPROACHES

1. Invite a computer employee from the business community to speak on computer systems.

2. Assign reading of articles on computer systems and have students report orally on the findings.

3. Have students prepare charts, displays, and bulletin boards to stress important aspects of data processing fundamentals.

4. View audiovisual aids associated with the unit.

5. Plan a tour of a large company using computer systems to give the students an overview of how a computer system works.

UNIT OUTLINE

DATA PROCESSING FUNDAMENTALS

I. Data Processing

- A. Data processing cycle
- B. Terminology
- C. Basic principles of computer systems
- D. Computer Systems
    1. mainframe
    2. minicomputer
    3. microcomputer
    4. supercomputer

II. Microcomputers

- A. Storage
    1. primary
    2. auxiliary
- B. Binary representation
    1. bits
    2. bytes
    3. words

III. Data Communication

- A. Kinds
    1. online systems
    2. online realtime systems
    3. time-sharing systems
    4. distributed systems
- B. Channels
    1. telegraph
    2. telephone
    3. coaxial cables
    4. microwave
    5. communication satellites
    6. laser beams
- C. Transmission
    1. analog
    2. digital
- D. Local area networks

SPECIFIC PERFORMANCE OBJECTIVES AND LEARNING ACTIVITIES

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1. On a written test, students will be able to define data processing terminology with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Terminology	1. Complete the word find puzzle of terms. (Appendix A) 2. Prepare note cards with words and definitions related to data processing. 3. Work in pairs and compete in a password game using note cards prepared in the previous activity.

---

2. On a written test, students will be able to list and explain the steps in the data processing cycle with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Data processing cycle	1. View an audiovisual aid to review the data processing cycle.

2. Review terminology related to the data processing cycle.

3. Prepare a poster illustrating the steps of the data processing cycle.

---

3. Given a list of computer systems in class, students will be able to describe one of these computer systems.

Subject Matter Content	Learning Activities
Computer Systems	1. Tour a local computer center to view the operations of a computer. 2. View an audio visual aid on different kinds of computer systems. 3. Work in small groups and select a computer system--mainframe, minicomputer, microcomputer, or supercomputer. Describe the system according to base system, options, memory, costs, and uses. 4. Present the findings to the class.

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4. In class, students will be able to identify the various brands of microcomputers.

Subject Matter Content	Learning Activities
Microcomputer	1. Collect current literature from various computer companies. 2. Prepare a bulletin board illustrating the various brands of microcomputers. 3. List on the board all the microcomputer brands gathered in Activity No. 1.

5. Students will be able to prepare a written report comparing and contrasting microcomputers. A checklist will be used for evaluation.

Subject Matter Content	Learning Activities
Microcomputer	1. Collect current literature featuring various microcomputers. 2. React to guest speakers from various microcomputer companies. 3. Select two different models of microcomputers. Write a report comparing and contrasting the two microcomputers. (Appendix B)

6. On a written test, students will be able to explain the main reason a binary system is used in main computer storage with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Binary Representation	1. View an audiovisual aid on the binary system. 2. Prepare a bulletin board illustrating the binary system. 3. Compare the binary system with the decimal system.

7. On a written test, students will be able to convert binary numbers to their decimal equivalents with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Binary Representation	1. Compare binary numbers with decimals. (Appendix C) 2. Practice converting binary numbers. (Appendix D) 3. Divide into two teams and compete in a binary conversion game.

8. On a written test, students will be able to explain the difference between a bit, a byte, and a word with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Binary Representation	1. Divide into several groups and prepare flash cards on binary systems. 2. Discuss the difference between a bit, a byte, and a word using the prepared flash cards. 3. View transparencies which illustrate the relationship of bits, bytes, and words.

9. On a written test, students will be able to list the major disadvantages and advantages of time-sharing with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Time-Sharing Systems	1. View an audiovisual aid which illustrates time-sharing. 2. Discuss in small groups the advantages and disadvantages of time-sharing. 3. List group findings on the board.

10. In class, students will be able to discuss how computer time-sharing systems operate.

Subject Matter Content	Learning Activities
Time-Sharing Systems	1. View transparencies showing a time-sharing operation. 2. Read current literature on time-sharing operations.

3. Draw a poster illustrating time-sharing in operation.
4. Explain the poster to the class.

---

11. In class, students will be able to explain different modes of transmission for data communication.

Subject Matter Content	Learning Activities
Data Communication Transmission	1. Collect current literature illustrating different modes of transmission. 2. Prepare a poster from material collected in the previous activity. 3. Discuss in small groups the need for various modes of transmission.

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12. On a written test, students will be able to compare three channels of data communication with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Data Communication Channels	1. View an audiovisual aid concerning channels of data communications. 2. Prepare a poster demonstrating each channel of data communication. 3. Work as a small group and prepare a chart identifying factors about each of the communication channels.

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13. On a written test, students will be able to list and describe three kinds of networking with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Data Communication Local Area Networks	1. View transparencies illustrating various kinds of networks.

2. Visit local businesses that use networking.

3. Compare and contrast the different networks.

---

14. Given statements related to computer systems on a written test, students will be able to identify whether the statements are true or false with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Computer Systems	1. Compose on note cards True/False questions related to the types of computer systems.
	2. Divide into two teams and compete in a True/False question-response game. If the statement is false, the player must correct the question to make it true. (The teacher may offer points for correct responses or offer extra points to the winning team on the unit test.)

APPENDIX A

WORD FIND

auxiliary storage
base
bit
bug
byte
computer
data
data base
data processing
distributed systems
information processing
input
keyboard
laser beams
main storage
mainframe
memory
microcomputer
minicomputer
online systems
output
printer
processor
programs
sorter
sorting
storing
system
telegraph lines
word processing

APPENDIX A

WORD FIND

I	N	F	O	R	M	A	T	I	O	N	P	R	O	C	E	S	S	I	N	G	E	T	W	C	E	Y	E	A	F
N	W	E	C	T	P	E	C	G	V	R	R	U	U	W	Y	Y	C	T	I	N	V	T	[illegible]	Y	N	R	W	I	E
P	W	E	C	R	I	X	C	E	C	O	O	T	T	F	S	S	C	Y	O	P	C	S	E	J	A	L	C	R	I
U	E	H	U	I	V	C	E	B	U	C	C	P	P	P	T	T	K	E	S	K	I	N	D	C	T	N	E	B	N
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O	B	E	F	X	I	M	S	I	C	E	S	T	T	I	O	M	I	W	X	G	B	N	U	J	H	F	C	N	E
U	I	H	E	A	X	B	M	E	V	N	S	T	O	R	I	N	G	E	X	U	O	M	W	C	B	G	N	F	R
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S	O	R	T	E	R	I	R	W	I	C	R	P	E	U	V	E	U	M	F	J	A	X	K	L	Y	V	D	O	P
D	T	B	U	I	E	F	G	O	Y	W	X	G	U	I	P	J	B	R	V	B	T	S	A	Z	R	N	U	M	L
T	I	V	D	X	I	O	O	T	V	W	X	R	I	P	L	K	H	M	G	E	W	X	Y	Y	U	B	F	S	C
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R	E	C	Y	I	M	I	R	V	N	I	B	D	W	Q	Z	B	I	O	G	E	C	Q	D	Z	H	I	M	R	V
D	R	V	B	E	I	N	T	I	S	C	T	E	N	G	N	I	S	S	E	C	O	R	P	D	R	O	W	W	O
A	C	R	V	N	R	F	E	C	T	N	I	P	L	Y	R	R	D	E	C	B	U	Y	B	N	M	S	E	E	C
T	E	C	H	N	C	R	H	C	U	I	O	E	D	C	N	U	W	Q	A	Z	R	Y	U	N	O	M	D	S	V
A	R	V	M	Y	E	A	E	I	O	K	J	G	F	D	V	B	N	I	O	G	F	D	C	S	B	N	Y	R	W
R	T	V	I	O	M	M	I	N	I	C	O	M	P	U	T	E	R	O	E	P	E	C	H	N	S	W	J	K	B
E	T	B	I	O	Y	E	V	Y	M	J	F	E	C	Y	M	Y	Q	C	J	O	P	L	K	M	H	T	C	X	E
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K	E	Y	B	O	A	R	D	P	E	B	U	I	T	G	F	C	E	G	A	R	O	T	S	N	I	A	M	P	O
E	T	U	Y	E	C	T	N	J	K	O	M	Y	R	C	W	S	R	C	R	O	I	Y	O	I	U	U	O	A	A
E	C	E	T	E	Y	H	V	C	X	Z	B	J	I	O	P	L	K	B	X	E	C	E	P	I	N	X	O	E	C
B	U	R	E	U	I	N	F	C	E	X	F	V	S	E	V	Y	I	K	J	N	G	R	T	C	G	I	E	C	T
V	Y	T	U	N	I	F	V	D	E	S	K	O	E	E	C	G	N	U	T	B	S	A	I	I	C	L	L	L	L
E	C	Y	T	G	B	J	N	I	O	K	H	R	N	E	C	T	W	A	X	F	Y	J	N	E	B	I	O	K	J
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E	C	T	U	H	B	V	D	E	B	I	O	B	L	A	S	E	R	B	E	A	M	S	E	V	Y	R	E	X	U
M	I	C	R	O	C	O	M	P	U	T	E	R	H	I	J	T	C	E	V	R	Y	H	F	C	S	Y	E	I	G
N	F	D	C	E	B	T	U	D	A	Z	X	B	P	E	V	Y	U	I	K	D	W	A	L	C	I	S	E	I	E
O	N	L	I	N	E	S	Y	S	T	E	M	S	A	R	E	S	O	J	A	I	N	W	F	K	A	T	R	I	Y
R	C	E	F	V	T	I	A	V	Y	K	Y	V	R	G	N	K	T	I	J	S	X	H	K	O	W	O	E	B	I
D	C	N	U	I	M	E	W	B	O	P	R	C	G	E	Y	I	J	N	D	A	C	G	E	I	O	R	U	T	N
B	T	V	A	I	K	R	I	E	N	U	O	E	E	N	R	H	V	W	D	C	Y	K	C	Y	E	A	E	H	[illegible]
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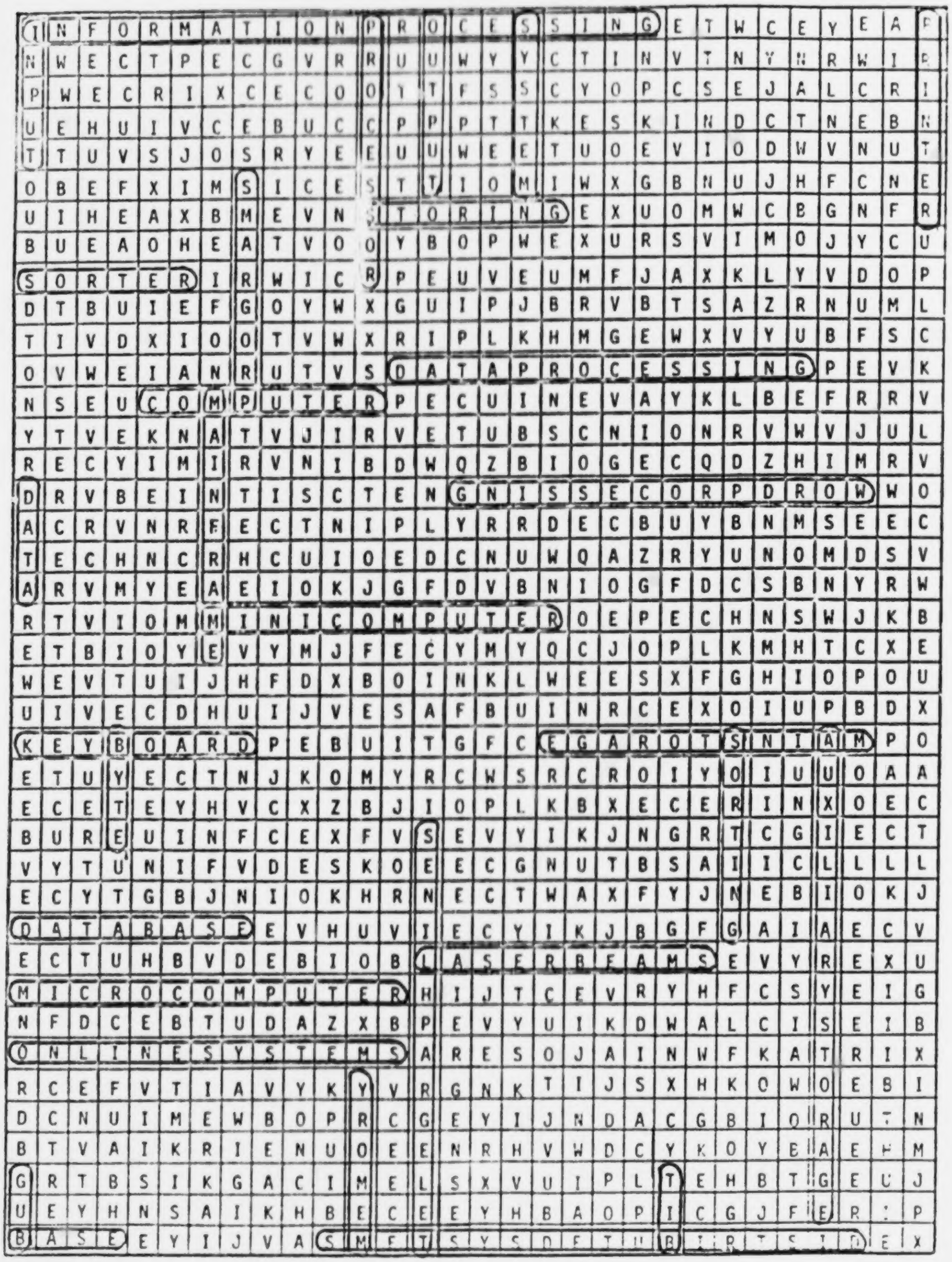
U	E	Y	H	N	S	A	I	K	H	B	E	C	E	E	Y	H	B	A	O	P	I	C	G	J	F	E	F	I	E
B	A	S	E	E	Y	I	J	V	A	S	M	E	T	S	Y	S	D	E	T	U	B	I	R	T	S	I	D	E	[illegible]

APPENDIX A

ANSWER KEY



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K	E	Y	B	O	A	R	D	P	E	B	U	I	T	G	F	C	E	G	A	R	O	T	S	N	I	A	M	P	O
E	T	U	Y	E	C	T	N	J	K	O	M	Y	R	C	W	S	R	C	R	O	I	Y	O	I	U	U	O	A	A
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N	F	D	C	E	B	T	U	D	A	Z	X	B	P	E	V	Y	U	I	K	D	W	A	L	C	I	S	E	I	B
O	N	L	I	N	E	S	Y	S	T	E	M	S	A	R	E	S	O	J	A	I	N	W	F	K	A	T	R	I	X
R	C	E	F	V	T	I	A	V	Y	K	Y	V	R	G	N	K	T	I	J	S	X	H	K	O	W	O	E	B	I
D	C	N	U	I	M	E	W	B	O	P	R	C	G	E	Y	I	J	N	D	A	C	G	B	I	O	R	U	T	N
B	T	V	A	I	K	R	I	E	N	U	O	E	E	N	R	H	V	W	D	C	Y	K	O	Y	E	A	E	H	M
G	R	T	B	S	I	K	G	A	C	I	M	E	L	S	X	V	U	I	P	L	T	E	H	B	T	G	E	U	J
U	E	Y	H	N	S	A	I	K	H	B	E	C	E	E	Y	H	B	A	O	P	I	C	G	J	F	E	R	I	P
B	A	S	E	E	Y	I	J	V	A	S	M	E	T	S	Y	S	D	E	T	U	B	I	R	T	S	I	D	E	X

APPENDIX B

WRITTEN REPORT EVALUATION

STUDENT'S NAME ________________ TOPIC ________________

**10 is the highest possible score in each category.

POINTS EARNED — CATEGORIES AND COMMENTS

________ 1. Neatness--(comments) ________________

________ 2. Subject/Verb Agreement (comments) ________________

________ 3. Spelling--(comments) ________________

________ 4. Punctuation/Capitalization--(comments) ________________

________ 5. Introductory Paragraph--(comments) ________________

________ 6. Body Content
   a. Name of system
   b. Type of languages
   c. Number of CPU's
   d. Size and number of real memory
   e. Code used to store data within real memory
   f. Numbering system used
   g. Amount of online disk storage space
   h. Major functions supported by operating system
   i. Type of applications run on the system
   j. Input and Output devices attached to system

________ 7. Concluding Paragraph--(comments) ________________

________ 8. Word Usages--(comments) ________________

________ 9. Following Directions--(comments) ________________

________ 10. Degree of Preparation--(comments) ________________

________ TOTAL POINTS EARNED ________ GRADE EARNED

APPENDIX C

BINARY CHART

DECIMAL EQUIVALENT	PLACE VALUE							
	128	64	32	16	8	4	2	1
0								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

APPENDIX C

ANSWER KEY

DECIMAL EQUIVALENT	PLACE VALUE 128	64	32	16	8	4	2	1
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	1	0
3	0	0	0	0	0	0	1	1
4	0	0	0	0	0	1	0	0
5	0	0	0	0	0	1	0	1
6	0	0	0	0	0	1	1	0
7	0	0	0	0	0	1	1	1
8	0	0	0	0	1	0	0	0
9	0	0	0	0	1	0	0	1
10	0	0	0	0	1	0	1	0
11	0	0	0	0	1	0	1	1
12	0	0	0	0	1	1	0	0

APPENDIX D

BINARY CHART

DECIMAL EQUIVALENT	PLACE VALUE							
	128	64	32	16	8	4	2	1
10								
8								
5								
64								
98								
32								
50								
27								
11								
33								

APPENDIX D

ANSWER KEY

DECIMAL EQUIVALENT	PLACE VALUE 128	64	32	16	8	4	2	1
10	0	0	0	0	1	0	1	0
8	0	0	0	0	1	0	0	0
5	0	0	0	0	0	1	0	1
64	0	1	0	0	0	0	0	0
98	0	1	1	0	0	0	1	0
32	0	0	1	0	0	0	0	0
50	0	0	1	1	0	0	1	0
27	0	0	0	1	1	0	1	1
11	0	0	0	0	1	0	1	1
33	0	0	1	0	0	0	0	1

UNIT TEST

DATA PROCESSING FUNDAMENTALS

A. MATCHING

Directions: Using the list in Column B select the term that best completes each statement and write the letter that represents your answer in the space next to each item.

Column A

_____ 1. Processed information.

_____ 2. Part of a computer that provides the ability to recall information.

_____ 3. Smallest unit of memory that can have an address.

_____ 4. Small computer; often a special-purpose or single-function computer on a single chip.

_____ 5. Smallest element of data in computer memory system.

_____ 6. Facts; the raw material of information.

_____ 7. Orderly safekeeping of information so that it may be used later.

_____ 8. Series of step-by-step instructions that provide a problem solution and tell the computer exactly what to do.

_____ 9. Data that is submitted to the computer for processing.

_____ 10. Device used to produce permanent (hard-copy) computer output.

Column B

A. Bit
B. Byte
C. Bug
D. Data
E. Input
F. Laser-beam
G. Memory
H. Microcomputer
I. Output
J. Printer
K. Program
L. Storing

UNIT TEST continued

B. LISTING

Directions: In class we discussed five major advantages and four major disadvantages of time-sharing. List three advantages and two disadvantages of time-sharing.

Advantages:

1.

2.

3.

Disadvantages:

1.

2.

C. TRUE/FALSE

Directions: Write T for true or F for false in the blank space next to each statement.

_____ 1. The system approach involves viewing an organization by its individual functional areas.

_____ 2. System flowcharts are designed to represent the detailed flow of information, using many different process symbols to show each operation.

_____ 3. When conducting a cost/benefit analysis, it is generally easier to determine costs than benefits.

_____ 4. Computerized information systems are always more efficient than manual information systems.

_____ 5. The goal of system implementation is to ensure that the system is completely debugged, operational, and accepted.

_____ 6. System programmers do not need a technical background.

_____ 7. Operating systems were developed to overcome the problem of time delays and errors caused by human operators.

_____ 8. Operating systems were developed in the 1960's.

_____ 9. When programs are executed concurrently, it means they are processed at the same time.

_____ 10. When two programs of the same priority request CPU resources at the same time, the decision as to which gets control first may be arbitrary.

D. BINARY NUMBERS

Directions: Convert the following binary numbers to decimal equivalents in the space provided.

Binary number	Decimal number
1. 0000	___________
2. 1111	___________
3. 0101	___________
4. 1011	___________
5. 0001	___________
6. 1010	___________
7. 0111	___________
8. 0011	___________
9. 1110	___________
10. 0100	___________

E. ESSAY

Directions: Discuss each item using complete sentences.

1. List and explain the three steps in the data processing cycle.

2. Why is a binary system used in main computer storage?

UNIT TEST continued

3. Explain the difference between a bit, a byte, and a word.

4. List and compare three channels of data communication.

5. Identify the three kinds of networking.

UNIT TEST

ANWSER KEY

A. MATCHING

Directions: Using the list in Column B select the term that best completes each statement and write the letter that represents your answer in the space next to each item.

Column A

__I__ 1. Processed information.

__G__ 2. Part of a computer that provides the ability to recall information.

__B__ 3. Smallest unit of memory that can have an address.

__H__ 4. Small computer; often a special-purpose or single-function computer on a single chip.

__A__ 5. Smallest element of data in computer memory system.

__D__ 6. Facts; the raw material of information.

__L__ 7. Orderly safekeeping of information so that it may be used later.

__K__ 8. Series of step-by-step instructions that provide a problem solution and tell the computer exactly what to do.

__E__ 9. Data that is submitted to the computer for processing.

__J__ 10. Device used to produce permanent (hard-copy) computer output.

Column B

A. Bit
B. Byte
C. Bug
D. Data
E. Input
F. Laser-beam
G. Memory
H. Microcomputer
I. Output
J. Printer
K. Program
L. Storing

UNIT TEST continued

B. LISTING

Directions: In class five major advantages and four major disadvantages of time-sharing were discussed. List three advantages and two disadvantages of time-sharing.

Advantages: (Student may list any three.)

1. It provides an economical means for small users to use the resources of a large computer system.
2. It allows each user to seem to possess a private computer.
3. It provides quick response capabilities.
4. Through resource pooling, time-sharing can provide access to greater numbers of application programs at a lower unit cost than that of privately owned and maintained computers.
5. The user who purchases computer time from a service bureau does not need to worry about equipment obsolescence.

Disadvantages: (Student may list any two.)

1. Users connected to the systems by telephone lines must worry about breakdowns in the lines or increases in communication costs.
2. Because data can be accessed quickly and easily in a time-sharing system, concern for security must be increased.
3. When quick response is not a necessity, time-sharing capability may be a needless expense.
4. System reliability may be lower than in non-time-sharing systems.

C. TRUE/FALSE

Directions: Write T for true or F for false in the blank space next to each statement.

F 1. The system approach involves viewing an organization by its individual functional areas.

F 2. System flowcharts are designed to represent the detailed flow of information through the use of many different process symbols to show each operation.

UNIT TEST continued

T 3. When conducting a cost/benefit analysis, it is generally easier to determine costs than benefits.

F 4. Computerized information systems are always more efficient than manual information systems.

T 5. The goal of system implementation is to ensure that the system is completely debugged, operational, and accepted.

F 6. System programmers do not need a technical background.

T 7. Operating systems were developed to overcome the problem of time delays and errors caused by human operators.

T 8. Operating systems were developed in the 1960's.

F 9. When programs are executed concurrently, it means they are processed at the same time.

T 10. When two programs of the same priority request CPU resources at the same time, the decision as to which gets control first may be arbitrary.

D. BINARY NUMBERS

Directions: Convert the following binary numbers to decimal equivalents in the space provided.

Binary number	Decimal number
1. 0000	0
2. 1111	15
3. 0101	5
4. 1011	11
5. 0001	1
6. 1010	10
7. 0111	7
8. 0011	3
9. 1110	14
10. 0100	4

E. ESSAY

Directions: Discuss each item using complete sentences.

1. List and explain the three steps in the data processing cycle.

   Input. Input is the introduction of data from some type of external storage medium into the computer's internal storage unit.

   Processing. Processing is the computer manipulation of data in solving a problem.

   Output. Output is the final result of data processing. Data is transferred from the computer's internal storage unit to some storage or output device.

2. Why is a binary system used in main computer storage?

   Data is stored in main computer storage as a series of bits being "on" or "off," symbolically represented as a "1" or "0." Since these bits can assume only one of these possible states (on or off), the representation of data in main computer storage is based upon the binary number system. Only two symbols are used to represent values.

3. Explain the difference between a bit, a byte, and a word.

   A bit is a binary digit used as an electrical signal in computers. A pattern of these adjacent bits or signals is a byte. Bytes represent a letter, number, or character. A word is a group of bits, characters, or bytes considered as an entity.

4. List and compare three channels of data communication.

   1. Telephone lines. Telephone lines serve as a useful data communication channel since telephones are provided in almost all areas of the world. They do provide one of the slower means of data communication.

   2. Satellite communication offers very rapid transmission of data to distant locations.

   3. Microwave transmission, while faster than telephone transmission, does not offer the speed of satellite transmission.

UNIT TEST continued

5. Identify three kinds of networking.

Star network--In a star network, multiple stations are connected to a central station; communication between stations must take place through the central station.

Ring network--In a ring network, each station is connected to its adjacent station.

Bus network--A bus network is a local area network in which multiple stations connected to a communication line can communicate directly with any other station on the line.

EVALUATION AND TESTING

Ways to Evaluate Pupil Growth

- Class notebook
- Class participation
- Completed worksheets
- Project
- Unit test
- Written report

EQUIPMENT AND SUPPLIES

Student

Textbook
Notebook
Bulletin Board Supplies
Poster
Newspapers
Data Processing Periodicals

Teacher

Overhead Projector
Transparencies
Film/Filmstrip Projector
Films and Filmstrips
Bulletin Board Supplies
Checklists
Periodicals
Note Cards
Handouts

DECISIONS! DECISIONS! DECISIONS!

APPLE

COMMODORE

IBM

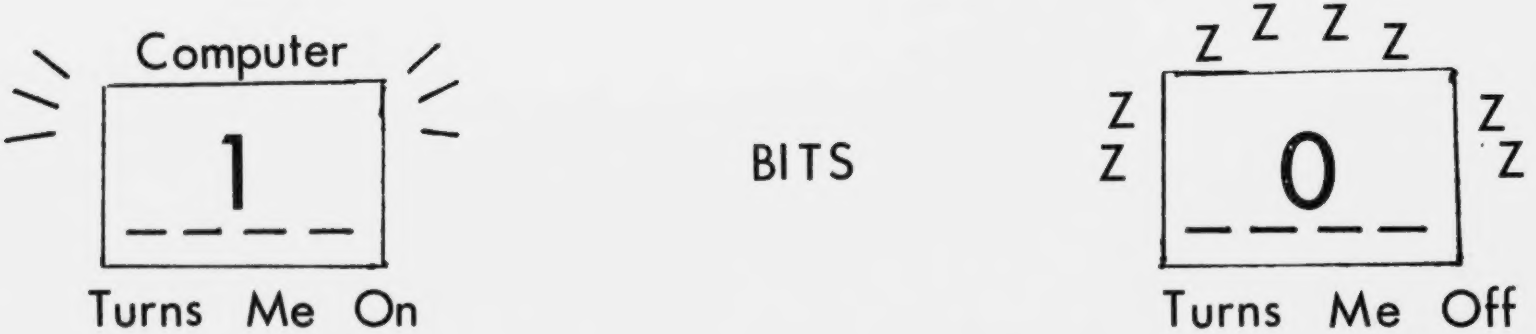
RADIO-SHACK

ATARI

MCINTOSH

WHICH ONE SHOULD I BUY?

BINARY SYSTEM


Computer
1
Turns Me On
BITS
Z Z Z Z
Z
Z
Z
Z
0
Turns Me Off

Binary digit ⟶ Bit

Bit = 1 or 0

Byte = 8 bits

SUPPLEMENTARY MATERIALS

Duplicating Masters

Micro 4 Programs in Basic by Ralph Ruby, Jr. and Don Roberts
Copy Masters, 1983.
J. Weston Walch, Publisher
Portland, ME 04104

Filmstrips/Cassettes

Computer Components
DX1081
(Four color filmstrips, four cassettes,
program guide, 1985)
Prentice-Hall Media
ServCode DX
150 White Plains Road
Tarrytown, NY 10591

Disk and Disk Operating Systems
XX6353
Career Aids, Inc.
20417 Nordhoff Street
Department U
Chatsworth, CA 91311

Getting to Know Micros
1089.90
Prentice-Hall Media
150 White Plains Road
Tarrytown, NY 10591

Periodicals

Business Computer Systems
Computer Center
P. O. Box 17693
Denver, CO 80217

Computers and People
Berkeley Enterprises, Inc.
815 Washington Street
Newtonville, MA 02160

The Computing Teacher
University of Oregon
1787 Agate Street
Eugene, OR 97403

SUPPLEMENTARY MATERIALS continued

80 Micro
Subscription Department
P. O. Box 981
Farmingdale, NY 11737

Mini-Micro Systems
Cohners Publishing Co.
270 St. Paul Street
Denver, CO 80206

Slides/Cassettes

Concepts of Data Processing
MPC Educational Publisher, (1983)
3839 White Plains Road
Bronx, NY 10467

Textbooks

Atkinson, June St. Clair. *Help with Computer Literacy*.
Boston: Houghton Mifflin Co., 1984
One Beacon Street
Boston, MA 02108

Ball, Marion J. *What Is a Computer*.
Boston: Houghton Mifflin Co., 1983
One Beacon Street
Boston, MA 02108

Clark, James F., and Judith J. Lambrecht. *Information Processing Concepts, Principles, and Procedures*.
Cincinnati: South-Western Publishing Co., 1985
1130 Gemini Lane
Dallas, TX 75229

Richman, Ellen. *Spotlight on Computer Literacy*.
New York: Random House, 1982
Random House School Division
Department 9048
201 East 50th Street
New York, NY 10022

Robichaud, Beryl, Eugene Muscat, and Alix-Marie Hall. *Introduction to Data Processing*, 3rd ed.
New York: Gregg Division McGraw-Hill Book Co., 1983
13955 Manchester Road
Manchester, MO 63011

SUPPLEMENTARY MATERIALS continued

Shelly, Gary B., and Thomas J. Cashman. Computer Fundamentals for an Information Age.
Brea: Anaheim Publishing Co., Inc., 1984
2632 Saturn Street
P. O. Box 9600
Brea, CA 92621

Shelly, Gary B., and Thomas J. Cashman. Introduction to Computers and Data Processing.
Brea: Anaheim Publishing Co., 1980
2632 Saturn Street
P. O. Box 9600
Brea, CA 92621

Wood, Merle. Computer Awareness.
Cincinnati: South-Western Publishing Co., 1982
130 Gemini Lane
Dallas, TX 75229

Transparencies

Computer Literacy
(CL-345T), 1983
National Instructional Systems, Inc.
P. O. Box 1177
Huntington Beach, CA 92647
(714) 968-3270

Intelligent Telephones & Networking
(TC-352T)
National Instructional Systems, Inc.
P. O. Box 1177
Huntington Beach, CA 92647

Introduction to Computers and Data Processing Transparency Masters
Anaheim Publishing Co.
2632 Saturn Street
Brea, CA 92621
(714) 993-3700

Introduction to Data Processing Transparencies
(J526), 1985
South-Western Publishing Co.
1130 Gemini Lane
Dallas, TX 75229

Telecommunications
(TC-347T)
National Instructional Systems, Inc.
P. O. Box 1177
Huntington Beach, CA 92647

SUPPLEMENTARY MATERIALS continued

Videotapes

Central Processor, The
Prismatron Productions, Inc.
155 Bueno Vista Avenue
Mill Valley, CA 94941
(415) 383-0449

Computers at Work: Concepts and Applications (Complete Series)
Lansford Publishing Co., Inc.
1088 Lincoln Avenue
P. O. Box 8711
San Jose, CA 95155
(408) 287-3105

Computer Numbers
Prismatron Productions, Inc.
155 Bueno Vista Avenue
Mill Valley, CA 94941
Also available as Sound/filmstrip; Sound/slide

RESOURCES

Couger, J. Daniel, and Fred R. McFadden. First Course in Data Processing with BASIC. 2nd ed. New York: John Wiley and Sons, 1984.

Dock, V. Thomas, and Edward L. Essick. Principles of Business Data Processing with MIS....including BASIC. 4th ed. Chicago: Science Research Associates, Inc., 1981.

Kroenke, David M. Business Computer Systems An Introduction. 2nd ed. Santa Cruz, CA: Mitchell Publishing, Inc., 1984.

Mandell, Steven L. Computers and Data Processing Concepts and Applications. 3rd ed. St. Paul, MN: West Publishing Co., 1985.

Mandell, Steven L. Computers and Data Processing Today with BASIC. St. Paul, MN: West Publishing Co., 1983.

Price, Wilson T. Introduction To Computer Data Processing. 3rd ed. New York: Holt, Rinehart and Winston, Inc., 1983.

Schnake, Marilyn A. The World of Computers and Data Processing. St. Paul, MN: West Publishing Co., 1985.

Spencer, Donald D. Computers and Information Processing. Columbus, OH: Charles E. Merrill Publishing Company, 1985.

Stern, Robert A., and Nancy Stern. An Introduction to Computers and Information Processing. 2nd ed. New York: John Wiley & Sons, 1985.

UNIT VIII

EQUIPMENT OPERATIONS

INTRODUCTION

This unit is designed to refine and expand equipment operations students learned in Data Processing I. Emphasis will be placed on a workable knowledge of data entry, storage, and retrieval, using computer software. Students will also examine the functions of operating systems and system software.

This unit provides an array of activities necessary for students to achieve successful mastery of assigned tasks.

COMPETENCIES

1. Demonstrate proficiency in correct operational procedures.
2. Maintain data processing equipment.
3. Enter data using available equipment.
4. Develop a basic understanding of operating systems and systems software.

GENERAL PERFORMANCE OBJECTIVES/GOALS

1. Refine keyboarding and data entry skills.
2. Exhibit a workable knowledge of data entry, storage, and retrieval.
3. Maintain data processing equipment.
4. Examine interface capabilities of hardware and software.
5. Use operating systems and systems software.

SPECIFIC PERFORMANCE OBJECTIVES AND MASTERY CRITERIA

1. On a written test, students will be able to define terms related to equipment operation with at least 75 percent accuracy.
2. On a written test, students will be able to explain the purpose of special function keys with at least 75 percent accuracy.

3. Provided with a data-entry device and exercises, students will be able to key data with at least 75 percent accuracy within a time allotment established by the teacher on each type of data-entry device available in class.

4. Students will be able to prepare a three-page report on current interface capabilities of equipment and software. Evaluation will be completed by use of a checklist.

5. Given prepared software and a project to complete, students will be able to boot the computer system, load the necessary program, and complete the entry and storage required with at least 75 percent accuracy within the time allotment set by the teacher.

6. On a written test, students will be able to discuss the functions of a computer operating system with at least 75 percent accuracy.

METHODOLOGY

The purpose of this unit is to enhance students' knowledge of computers as they relate to data entry, processing, storage, and retrieval. Student skill levels will also be refined.

Books, operators' manuals, workbooks, sales catalogs, prepared software, and demonstrations may be used to supplement the teacher's lectures. Many of these materials are listed in the supplementary section of this unit. A variety of activities designed to assist in student mastery of objectives is included in the activities section of the unit.

SUGGESTED INTEREST APPROACHES

1. Invite a data processing operations employee to discuss applications of equipment operation.

2. Invite a representative from a company to discuss systems operations and demonstrate various available software.

3. Have students research available literature pertaining to operating systems and reveal their findings in group discussions.

4. View filmstrips pertaining to data storage and retrieval.

5. Have students prepare a bulletin board display to emphasize important aspects of equipment operation.

6. Have students play bingo, using teacher prepared cards with equipment operation terminology.

7. Have students complete a word search puzzle.

UNIT OUTLINE

EQUIPMENT OPERATIONS

I. Fundamentals of Equipment Operation

  A. Equipment operation terminology
  B. Keyboard and data entry skills
    1. dexterity drills
    2. timed writings
  C. Capabilities and limitations of equipment

II. Interface with Information Systems

  A. Definition of user interface
  B. Display device
    1. cursor
    2. color
    3. graphics
  C. Data and command entry device
    1. keyboard
    2. mouse
    3. touch screen
    4. voice
  D. Software
    1. prompts
    2. menus
    3. submenus
    4. icons
    5. desktop screens
    6. windows

III. Operation of Microcomputers

  A. System startup (booting the system)
  B. System power down
  C. Program loading
  D. Entry of data
  E. Storage of data
  F. Retrieval of data
  G. Update of data

IV. Fundamentals of Operating Systems

  A. Definition of operating system
  B. System components
    1. control programs

    2. service programs
        a. compilers
        b. utilities
        c. debugging aids
        d. sort/merge
C. Types of operating systems
    1. microcomputers
    2. large computers

SPECIFIC PERFORMANCE OBJECTIVES AND LEARNING ACTIVITIES

---

1. On a written test, students will be able to define equipment operation related terms with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Equipment Operations	1. Complete a word search puzzle. (Appendix A) 2. Define various equipment operations terms. (Appendix B) 3. View a filmstrip on machine operations.

---

2. On a written test, students will be able to explain the purpose of special function keys with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Equipment Operations	1. Complete a handout identifying special function keys. (Appendix C) 2. Compare special function keys of various computers. 3. Use prepared software and complete a project at the microcomputer.

APPENDIX A

WORD SEARCH

Apple DOS
application software
color
compilers
CRT
cursor
data entry device
debugging aids
desk top screens
diskette
graphic
ICON
keyboard
magnetic disk
menu
microcomputer
mouse
MS DOS
prompts
sort/merge
submenus
touch screen
utilities
voice
windows

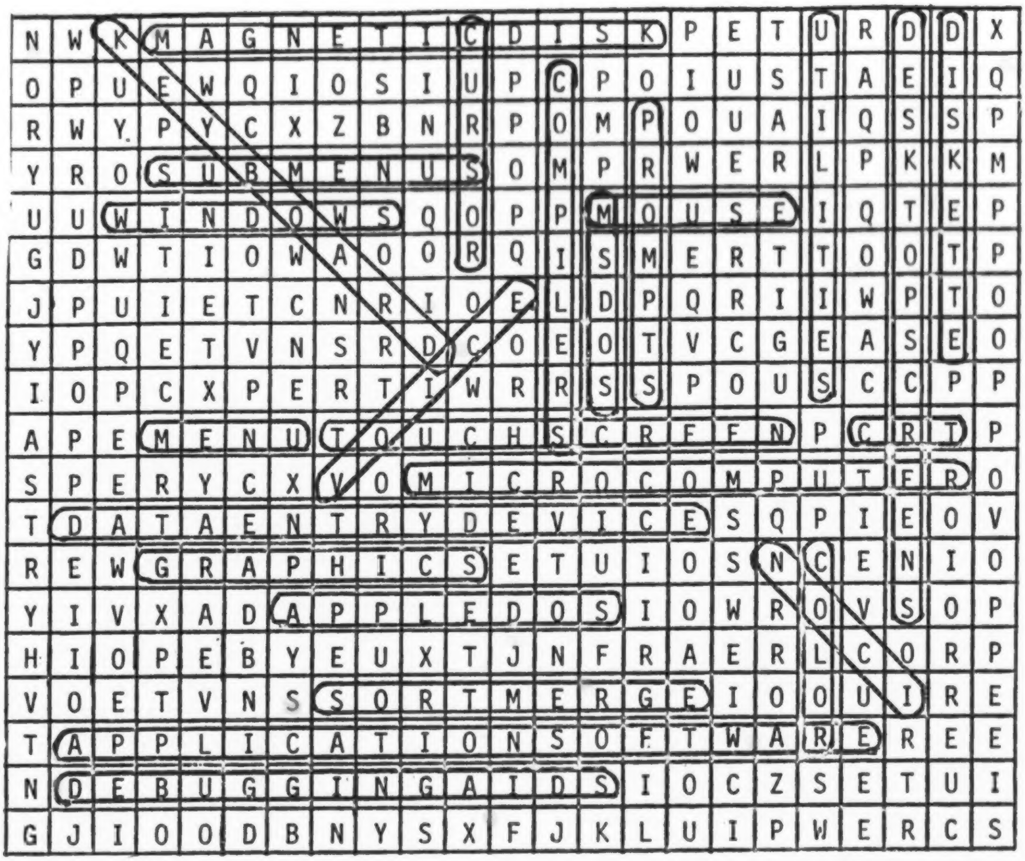
APPENDIX A

WORD SEARCH

N	W	K	M	A	G	N	E	T	I	C	D	I	S	K	P	E	T	U	R	D	D	X
O	P	U	E	W	Q	I	O	S	I	U	P	C	P	O	I	U	S	T	A	E	I	Q
R	W	Y	P	Y	C	X	Z	B	N	R	P	O	M	P	O	U	A	I	Q	S	S	P
Y	R	O	S	U	B	M	E	N	U	S	O	M	P	R	W	E	R	L	P	K	K	M
U	U	W	I	N	D	O	W	S	Q	O	P	P	M	O	U	S	E	I	Q	T	E	P
G	D	W	T	I	O	W	A	O	O	R	Q	I	S	M	E	R	T	T	O	O	T	P
J	P	U	I	E	T	C	N	R	I	O	E	L	D	P	Q	R	I	I	W	P	T	O
Y	P	Q	E	T	V	N	S	R	D	C	O	E	O	T	V	C	G	E	A	S	E	O
I	O	P	C	X	P	E	R	T	I	W	R	R	S	S	P	O	U	S	C	C	P	P
A	P	E	M	E	N	U	T	O	U	C	H	S	C	R	E	E	N	P	C	R	T	P
S	P	E	R	Y	C	X	V	O	M	I	C	R	O	C	O	M	P	U	T	E	R	O
T	D	A	T	A	E	N	T	R	Y	D	E	V	I	C	E	S	Q	P	I	E	O	V
R	E	W	G	R	A	P	H	I	C	S	E	T	U	I	O	S	N	C	E	N	I	O
Y	I	V	X	A	D	A	P	P	L	E	D	O	S	I	O	W	R	O	V	S	O	P
H	I	O	P	E	B	Y	E	U	X	T	J	N	F	R	A	E	R	L	C	O	R	P
V	O	E	T	V	N	S	S	O	R	T	M	E	R	G	E	I	O	O	U	I	R	E
T	A	P	P	L	I	C	A	T	I	O	N	S	O	F	T	W	A	R	E	R	E	E
N	D	E	B	U	G	G	I	N	G	A	I	D	S	I	O	C	Z	S	E	T	U	I
G	J	I	O	O	D	B	N	Y	S	X	F	J	K	L	U	I	P	W	E	R	C	S

APPENDIX A

ANSWER KEY



N	W	K	M	A	G	N	E	T	I	C	D	I	S	K	P	E	T	U	R	D	D	X
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R	W	Y	P	Y	C	X	Z	B	N	R	P	O	M	P	O	U	A	I	Q	S	S	P
Y	R	O	S	U	B	M	E	N	U	S	O	M	P	R	W	E	R	L	P	K	K	M
U	U	W	I	N	D	O	W	S	Q	O	P	P	M	O	U	S	E	I	Q	T	E	P
G	D	W	T	I	O	W	A	O	O	R	Q	I	S	M	E	R	T	T	O	O	T	P
J	P	U	I	E	T	C	N	R	I	O	E	L	D	P	Q	R	I	I	W	P	T	O
Y	P	Q	E	T	V	N	S	R	D	C	O	E	O	T	V	C	G	E	A	S	E	O
I	O	P	C	X	P	E	R	T	I	W	R	R	S	S	P	O	U	S	C	C	P	P
A	P	E	M	E	N	U	T	O	U	C	H	S	C	R	E	E	N	P	C	R	T	P
S	P	E	R	Y	C	X	V	O	M	I	C	R	O	C	O	M	P	U	T	E	R	O
T	D	A	T	A	E	N	T	R	Y	D	E	V	I	C	E	S	Q	P	I	E	O	V
R	E	W	G	R	A	P	H	I	C	S	E	T	U	I	O	S	N	C	E	N	I	O
Y	I	V	X	A	D	A	P	P	L	E	D	O	S	I	O	W	R	O	V	S	O	P
H	I	O	P	E	B	Y	E	U	X	T	J	N	F	R	A	E	R	L	C	O	R	P
V	O	E	T	V	N	S	S	O	R	T	M	E	R	G	E	I	O	O	U	I	R	E
T	A	P	P	L	I	C	A	T	I	O	N	S	O	F	T	W	A	R	E	R	E	E
N	D	E	B	U	G	G	I	N	G	A	I	D	S	I	O	C	Z	S	E	T	U	I
G	J	I	O	O	D	B	N	Y	S	X	F	J	K	L	U	I	P	W	E	R	C	S

APPENDIX B

Directions: Define each term, using complete sentences.

1. Dos
2. application software
3. boot
4. CRT
5. central processing unit
6. cursor
7. data entry device
8. diskette
9. input device
10. interface
11. keyboard
12. magnetic disk
13. menu
14. microcomputers
15. mouse
16. operating system
17. output device
18. program
19. prompt
20. RAM
21. ROM
22. secondary storage device
23. systems software

APPENDIX B

ANSWER KEY

1. Dos--Dos is a disk operating system used for computers.
2. application software--This software performs an application-related function on a computer.
3. boot--Boot is a term used to refer to the start-up steps involved in turning on the computer and loading a disk.
4. CRT--This is an abbreviation for cathode ray tube. It is an electronic tube with a screen upon which information may be displayed.
5. central processing unit--The central processing unit has a memory (main storage), an arithmetic unit, a logic unit, and a control unit.
6. cursor--The cursor is a symbol which indicates where on the screen the next character will be entered.
7. data entry device--This is a unit that allows an accurate entry of data which will later be loaded into computer memory and processed by a computer.
8. diskette--This is an oxide-coated plastic disk, also called a floppy disk. It is commonly used on personal computers.
9. input device--An input device reads or transfers data into a computer.
10. interface--Interface refers to the connection between a computer and the user.
11. keyboard--This is a commonly used input device that sends data to the processor each time a key is struck.
12. magnetic disk--Magnetic disks are oxide-coated platters that are used to store data as electronic spots.
13. menu--A menu is a display on a CRT screen that allows a user to make a selection from multiple alternatives.
14. microcomputers--These are small computers, also called personal computers, with less memory capacity and lower speeds than the larger mainframes and minicomputers.

15. mouse--This is a small, light-weight device that can easily fit in the palm of one's hand and be moved across a flat surface to control the movement of the cursor and select menu choices.

16. operating system--This is a collection of programs which interface between the user or application program and the computer hardware itself to control and manage the operations of the computer.

17. output device--An output device writes or records data from a computer on some outside material or media.

18. program--A program is a set of instructions the computer follows to process data.

19. prompt--A prompt is a message displayed to the user which provides information or instructions regarding some entry to be made or action to be taken.

20. RAM--This is an abbreviation for random access memory. It is the working memory of the computer into which applications programs can be loaded from outside and then executed.

21. ROM--This is read-only memory. This is permanently programmed with one group of frequently used instructions.

22. secondary storage device--A secondary storage device is used to keep or store large amounts of data.

23. systems software--These are programs designed to keep the computer functioning and to perform many everyday tasks related to the operation of the computer system.

APPENDIX C

SPECIAL FUNCTION KEYS

Directions: Match the following special keys with their key function. Place your answer in the space provided. If your micro does not have a key function for a special key, place a "Z" in the space provided.

KEY FUNCTION

_____ 1. Moves the cursor to the right of the screen

_____ 2. Erases to end of display

_____ 3. Moves cursor to the left at accelerated rate

_____ 4. Causes computer to scroll upward

_____ 5. Moves the cursor to the left and erases the character

_____ 6. Cancels line being typed and erases the display

_____ 7. Tells computer to ignore a line being typed and return to start a new line

_____ 8. Returns cursor and enters line as a program statement

_____ 9. Causes character appearing on the top half of a key to be displayed

_____10. Moves cursor to right at accelerated rate

A.	BREAK	CTRL X
B.	SHIFT	SHIFT
C.	ENTER	RETURN
D.	←	ESC J
E.	→	ESC K
F.	SHIFT ←	RPT ←
G.	SHIFT @	ESC F
H.	CLEAR	ESC @
I.	SHIFT →	RPT →
J.	SHIFT ↓ /	SHIFT ↓

*Optional: Identify additional special keys that your micro may have and give the key function for each.

APPENDIX C

ANSWER KEY

Directions: Match the following special keys with their key function. Place your answer in the space provided. If your micro does not have a key function for a special key, place a "Z" in the space provided.

KEY FUNCTION

E 1. Moves the cursor to the right of the screen

G 2. Erases to end of display

F 3. Moves cursor to the left at accelerated rate

Z 4. Causes computer to scroll upward

D 5. Moves the cursor to the left and erases the character

H 6. Cancels line being typed and erases the display

A 7. Tells computer to ignore a line being typed and return to start a new line

C 8. Returns cursor and enters line as a program statement

B 9. Causes character appearing on the top half of a key to be displayed

I 10. Moves cursor to right at accelerated rate

	TRS-80	APPLE II
A.	BREAK	CTRL X
B.	SHIFT	SHIFT
C.	ENTER	RETURN
D.	←	ESC J
E.	→	ESC K
F.	SHIFT ←	RPT ←
G.	SHIFT @	ESC F
H.	CLEAR	ESC @
I.	SHIFT →	RPT →
J.	SHIFT ↓ /	SHIFT ↓

*Optional: Identify additional special keys that your micro may have and give the key function for each.

APPENDIX D

DEXTERITY DRILL

4 a 2 0 7	9 3 3 8 5	w c 4 m 1
z u 5 9 c	o 1 d 1 6	y s 3 9 1
g 3 3 x d	z 1 r 3 7	t 7 g 5 5
7 2 7 d 3	u n 9 0 1	1 v 0 j a
1 0 1 0 0	p 6 c d ;	6 u e 4 w
2 h 5 r y	h v g 8 2	7 3 i w 7
4 9 c 8 x	5 1 t 6 1	8 2 c r 4
v m 6 4 j	z p 9 4 n	b y i 4 4
u p 8 3 e	6 n y 5 b	g 7 h 5 6
q p 0 1 z	/ x c 4 3	7 4 1 u 0

APPENDIX E

WRITTEN REPORT EVALUATION

STUDENT'S NAME____________________ TOPIC________________________

**10 is the highest possible score in each category.

POINTS EARNED CATEGORIES AND COMMENTS

__________ 1. Neatness--(comments)____________________________________
____

__________ 2. Subject/Verb Agreement (comments)_______________________
____

__________ 3. Spelling--(comments)____________________________________
____

__________ 4. Punctuation/Capitalization--(comments)__________________
____

__________ 5. Introductory Paragraph--(comments)______________________
____

__________ 6. Body Content or Organization--(comments)________________
____

__________ 7. Concluding Paragraph--(comments)________________________
____

__________ 8. Word Usages--(comments)_________________________________
____

__________ 9. Following Directions--(comments)________________________
____

__________ 10. Degree of Preparation--(comments)______________________
____

__________TOTAL POINTS EARNED (possible 100)

__________GRADE EARNED

____
EVALUATOR'S SIGNATURE

*Used with the permission of Kathleen Audiffred of East St. John High.

APPENDIX F

POPULAR OPERATING SYSTEMS

System	Developer
UNIX	Bell Laboratories; UNIX is considered by many to be one of the more advanced operating systems for more powerful microcomputers and minicomputers.
XENIX	Microsoft Corporation; XENIX is a UNIX work-like operating system.
PC-DOS	International Business Machines Corporation (IBM); a version of MS-DOS, used on IBM's personal computer.
MS-DOS	Microsoft Corporation; used on many popular microcomputers.
CP/M	Digital Research, Inc.; used on many popular microcomputers.
Apple-DOS	Apple Computer, Inc.; used on some of the Apple family of microcomputers.
TRS-DOS	Radio Shack Division of Tandy Corporation; used on some of the TRS-80 family of microcomputers.

UNIT TEST

EQUIPMENT OPERATIONS

A. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents your answer in the space next to each statement.

	Column A		Column B
_____ 1.	Cathode ray tube	A.	Apple-DOS
_____ 2.	Operating system used by the Apple family of computers	B.	CRT
_____ 3.	Message displayed regarding some entry to be made	C.	Cursor
_____ 4.	List of options from which the user may choose	D.	Diskette
_____ 5.	Read-Only Memory	E.	Menu
_____ 6.	Marker on a video display	F.	Operating System
_____ 7.	Series of programs that controls the operation of the computer system	G.	Prompt
_____ 8.	Used to store data	H.	RAM
_____ 9.	Computer memory used to store application programs and data	I.	ROM
_____10.	Operating system used by Radio Shack	J.	TRS-DOS

UNIT TEST continued

B. COMPLETION

Directions: Give the purpose of each of the following special function keys. (TRS-80) (Teacher will need to adapt this section to include keys for computers used in class.)

SHIFT 1. ______________________________
____

← 2. ______________________________
____

ENTER 3. ______________________________
____

BREAK 4. ______________________________
____

→ 5. ______________________________
____

SHIFT @ 6. ______________________________
____

C. ESSAY

Directions: Discuss each item, using complete sentences.

1. Discuss three functions of an operating system.

2. Define user interface.

UNIT TEST

ANSWER KEY

A. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents your answer in the space next to each statement.

Column A

B 1. Cathode ray tube

A 2. Operating system used by the Apple family of computers

G 3. Message displayed regarding some entry to be made

E 4. List of options from which the user may choose

I 5. Read-Only Memory

C 6. Marker on a video display

F 7. Series of programs that controls the operation of the computer system

D 8. Used to store data

H 9. Computer memory used to store application programs and data

J 10. Operating system used by Radio Shack

Column B

A. Apple-DOS

B. CRT

C. Cursor

D. Diskette

E. Menu

F. Operating System

G. Prompt

H. RAM

I. ROM

J. TRS-DOS

UNIT TEST continued

B. COMPLETION

Directions: Give the purpose of each of the following special function keys. (TRS-80) (Teacher will need to adapt this section to include keys for computers used in class.)

SHIFT	1. Used to print top half of key.
←	2. moves the cursor to the left and erases the character.
ENTER	3. Returns cursor and enters line as a program statement.
BREAK	4. Tells computer to ignore line being typed and return to start of new line.
→	5. Moves cursor to the right one space at a time.
SHIFT @	6. Erases to the end of the display.

C. ESSAY

Directions: Discuss each item, using complete sentences.

1. Discuss three functions of an operating system.
    1. It establishes and controls communication between the processor, storage, and input and output devices.
    2. It allows translation of a high level language into processable computer language.
    3. It provides a method for storing and saving programs and data on auxiliary storage which had been in main computer memory.

UNIT TEST continued

2. Define user interface.

   User interface with the computer is a combination of hardware and software that allows a user to communicate with and control the functions of an information system. Through it, the user can control the computer, request information, and respond to messages from the computer.

EVALUATION AND TESTING

Ways to Evaluate Pupil Growth

- Bulletin board displays
- Class notebook
- Class participation
- Data entry exercises
- Demonstration of equipment (proper use)
- Tests
- Written reports

EQUIPMENT AND SUPPLIES

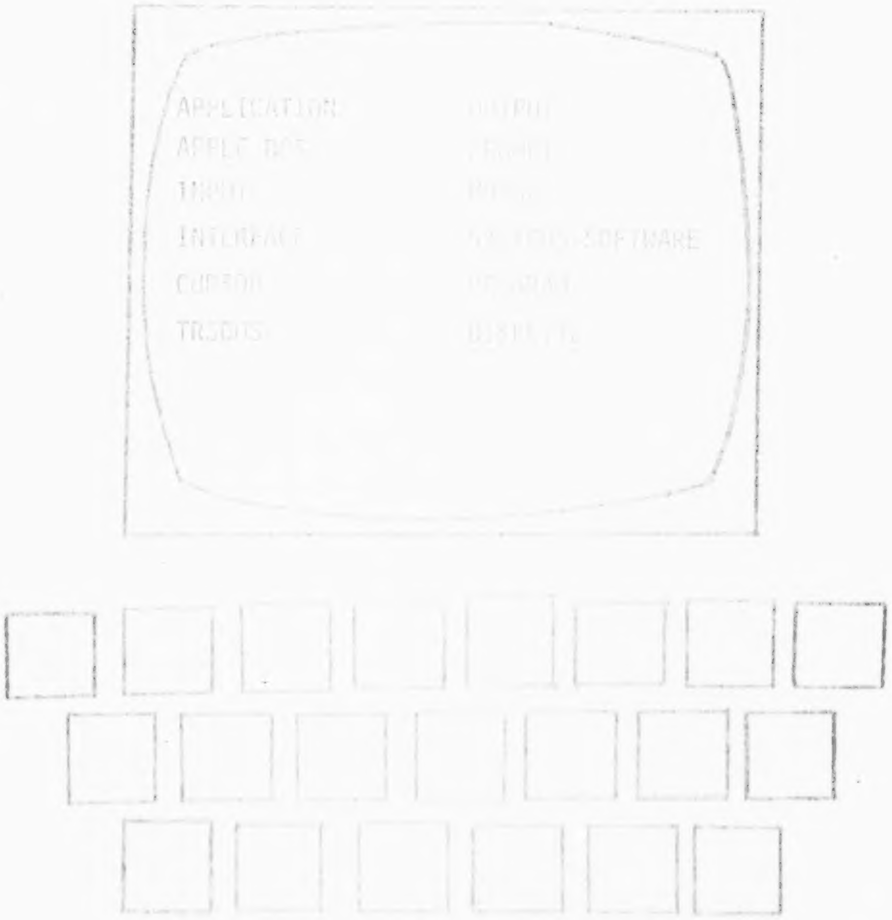
Student

Textbook/Workbook
Notebook
Periodicals
Operator's Manual
Handouts
Instruction Sheets
Computer
Software
Brochures
Computer Catalogs

Teacher

Textbook and Manual
Overhead Projector
Transparencies
Film/filmstrip Projector
Cassette Recorder
Films, Filmstrips, and Cassettes
Periodicals
Bulletin Board Supplies
Computer Catalogs
Computers
Software
Operator's Manuals

HOW MANY EQUIPMENT OPERATION TERMS CAN YOU IDENTIFY ?


APPLICATIONS
APPLE DOS
INPUT
INTERFACE
CURSOR
TRSDOS
OUTPUT
PROMPT
MODEM
SYSTEMS SOFTWARE
PROGRAM
DISKETTE

RESOURCES

Atkinson, June St. Clair. Help With Computer Literacy. Boston: Houghton Mifflin Company, 1984.

Bux, William E., and Jane F. Clark. Data Entry Activities. Cincinnati: South-Western Publishing Company, 1980.

Buzby, Beth Moorer. Data Entry Concepts and Applications. Chicago: Science Research Associates, Inc., 1981.

Capron, H. L., and Brian K. Williams. Computers and Data Processing. Menlo Park, CA: The Benjamin/Cummings Publishing Company, Inc. 1984.

Clark, James. F., and Judith Lambrecht. Information Processing. Cincinnati: South-Western Publishing Company, 1985.

Daggert, Willard R., Kamiron S. Badrkhan, and Benedict Kruse. Computers and Information Technology. Cincinnati: South-Western Publishing Company, 1985.

Essick, Edward L. Essentials of Computer Data Processing. Chicago: Science Research Associates, Inc., 1984.

Kindred, Alton R. Introduction to Computers. Englewood Cliffs, NJ: Prentice-Hall Inc., 1982.

Lee, Iva Helen. Data Entry Concepts and Exercises. New York: John Wiley and Sons, 1982.

Majernik, John A. All About Data Processing. Portland, ME: J. Weston Walch, 1978.

Mandell, Steven L. Computers and Data Processing Today. St. Paul, MN: West Publishing Company, 1983.

Robichaud, Beryl, Eugene Muscat, and Alix-Marie Hall. Introduction to Data Processing. New York: Gregg Division, McGraw-Hill Book Company, 1983.

Shelly, Gary B., and Thomas J. Cashman. Computer Fundamentals for an Information Age. Brea, CA: Anaheim Publishing Company, Inc., 1984.

Wood, Merle. Computer Awareness. Cincinnati: South-Western Publishing Company, 1982.

UNIT IX

ADVANCED PROGRAMMING

INTRODUCTION

In preparing for computer-related studies or work, students need to explore further the principles and concepts of programming and to recognize that good programming is essential.

The purpose of this unit is to provide students with a more extensive knowledge of the BASIC language and to introduce several other languages that are used in business and in postsecondary training.

COMPETENCIES

1. Review information previously learned in programming.
2. Structure, design, and execute programs for given business problems.
3. Demonstrate a cursory knowledge of several other programming languages.

GENERAL PERFORMANCE OBJECTIVES/GOALS

1. Demonstrate an understanding of previously introduced BASIC statements, commands, and flowcharting symbols.
2. Construct flowcharts for given business problems.
3. Write programs for the given business problems.
4. Differentiate between commonly used computer languages.

SPECIFIC PERFORMANCE OBJECTIVES AND MASTERY CRITERIA

1. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using previously learned symbols with at least 75 percent accuracy.
2. Using a completed flowchart, students will be able to code with at least 75 percent accuracy the program for the problem using previously learned statements.

3. Students will be able to list the steps in the run, save and load procedures on a written test with at least 75 percent accuracy.

4. Using the previously prepared program, students will be able to organize necessary documentation including the flowchart, the coded program, and a copy of the output with at least 75 percent accuracy.

5. Given a business programming problem, students will be able to deduce the steps in the problem, construct a flowchart, and code the program using string variables with at least 75 percent accuracy.

6. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowchart symbols to represent formulas with at least 75 percent accuracy.

7. Using a completed flowchart, students will be able to code with at least 75 percent accuracy the program for the problem using formulas.

8. Given a business programming problem, students will be able to deduce the steps in the problem, construct a flowchart, and code the program using the integer functions such as random, sign, absolute, and square, with at least 75 percent accuracy.

9. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent subroutines, the GOSUB statement, and the RETURN statement with at least 75 percent accuracy.

10. Using a completed flowchart, students will be able to code with at least 75 percent accuracy the program for the problem using subroutines, the GOSUB statement, and the RETURN statement.

11. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent arrays and the DIMENSION statement with at least 75 percent accuracy.

12. Using a completed flowchart, students will be able to code with at least 75 percent accuracy the program for the problem using arrays and the DIMENSION statement.

13. On a written test, students will be able to match with at least 75 percent accuracy the definitions and uses of BASIC, PASCAL, COBOL, FORTRAN, LOGO, and RPG programming languages.

14. On a written test, students will be able to list with at least 75 percent accuracy advantages and disadvantages of BASIC, PASCAL, COBOL, FORTRAN, LOGO, and RPG languages.

15. Given a problem on a written test, students will be able to construct a flowchart and write the BASIC code to solve the problem with at least 75 percent accuracy.

METHODOLOGY

The purpose of this unit is to provide a more extensive knowledge of programming skills in BASIC language. Activities will be given to allow practice in flowcharting, coding, and executing problems of a business nature. Other activities will allow students to explore the advantages, disadvantages, and uses of several other programming languages.

Books, workbooks, and periodicals are listed in the supplementary materials section of this unit for further references in developing this unit.

SUGGESTED INTEREST APPROACHES

1. Have students prepare charts and posters to stress important aspects of good programming.
2. View audiovisual materials associated with programming.
3. Display students' flowcharts and programs in the classroom.
4. Have students collect from periodicals selected topics to be discussed in class.
5. Have students use the library to research articles found in periodicals and report orally to the class.
6. Organize a tutorial program for Data Processing students using advanced students as tutors.
7. Establish procedures which would allow students to complete data entry activities for the school.
8. Arrange for students to interview professionals in the programming field and make reports to the class.

UNIT OUTLINE

ADVANCED PROGRAMMING

I. Programming Review

- A. Flowcharting Symbols
    1. terminal
    2. input/output
    3. processing
    4. decision
    5. connector
    6. offpage connector
    7. flow direction arrow

- B. BASIC Statements
    1. REM
    2. PRINT
    3. GOTO
    4. END
    5. LET
    6. INPUT
    7. FOR/NEXT
    8. READ/DATA
    9. IF/THEN

II. Storage and Retrieval Procedures

- A. RUN
- B. SAVE
- C. LOAD

III. Program Documentation

- A. Flowchart
- B. Program
- C. Output

IV. Flowchart Preparation

- A. Steps in a flowchart problem
- B. Construction of a flowchart

V. Program Development

- A. Program coding in BASIC
    1. string variables
    2. math hierarchy

3. functions
    a. integer
    b. random
    c. sign
    d. absolute
    e. square
4. subroutines
5. GOSUB
6. RETURN
7. arrays
8. DIM

B. Program Code Entry
C. Program Debugging

VI. Programming Languages

A. Definitions and Uses
B. Advantages and Disadvantages
    1. BASIC
    2. Pascal
    3. COBOL
    4. FORTRAN
    5. LOGO
    6. RPG

SPECIFIC PERFORMANCE OBJECTIVES AND LEARNING ACTIVITIES

---

1. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using previously learned symbols with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Programming Review	1. Match flowcharting symbols to definitions. 2. Draw flowcharting symbols from dictated BASIC statements. 3. Construct a flowchart for a business problem using previously learned symbols.

2. Using a completed flowchart, students will be able to code with at least 75 percent accuracy the program for the problem using previously learned statements.

Subject Matter Content	Learning Activities
Programming Review	1. View on the board the relationship between the flowchart steps and the lines in a program. 2. Use the previously constructed flowchart to code the steps of a business problem. 3. Key the program into the computer. 4. Debug and rekey the program. Program and its output will be corrected to 100 percent accuracy.

3. Students will be able to list the steps in the RUN, SAVE, and LOAD procedures on a written test with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Storage and Retrieval Procedures RUN SAVE LOAD	1. Observe a demonstration on running, saving, and loading a program. 2. Practice procedures on the computer. 3. List and discuss the steps in the RUN, SAVE, and LOAD procedures.

4. Using the previously prepared program, students will be able to organize necessary documentation including the flowchart, the coded program, and a copy of the output, with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Program Documentation Flowchart	1. Discuss program documentation.

Program Output	2. Organize necessary documentation including the flowchart, the coded program, and a copy of the output from the previously prepared program.

---

5. Given a business programming problem, students will be able to deduce the steps in the problem, construct a flowchart, and code the program using string variables with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Program Development String Variables	1. View a transparency on the use of string variables.
	2. Discuss the use of string variables from examples on the board.
	3. Complete and check a worksheet which requires construction of a flowchart for a problem using string variables. (Appendix A, Step 1)
	4. Construct a flowchart for a business problem using string variables.
Program Coding in BASIC	5. Use the flowchart constructed in the worksheet to code the steps of a business problem. (Appendix A, Step 2)
	6. Key the program into the computer.
	7. Debug and rekey the program. Program and its output will be corrected to 100 percent accuracy.

---

6. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowchart symbols to represent formulas with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Program Development Math Hierarchy	1. View on the board the steps in the math hierarchy.

	2. View on the board math problems broken into correct steps according to the hierarchy.
	3. Practice solving math problems.
	4. Complete and check a worksheet as a review of the math hierarchy. (Appendix B)
Flowchart Preparation	5. View a transparency showing formulas used in flowcharts.
	6. Construct a flowchart for a business problem using math formulas.

---

7. Using a completed flowchart, students will be able to code with at least 75 percent accuracy the program for the problem using formulas.

Subject Matter Content	Learning Activities
Program Development Math Hierarchy	1. Use the previously constructed flowchart to code the steps in a business problem.
	2. Key the program into the computer.
	3. Debug and rekey the program. Program and its output will be corrected to 100 percent accuracy.
	4. Organize necessary documentation including the flowchart, the coded program, and a copy of the output.

---

8. Given a business programming problem, students will be able to deduce the steps in the problem, construct a flowchart, and code the program using functions such as integer, random sign, absolute, and square with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Program Development Functions integer random	1. View transparencies showing formula lines using the functions in programs.

sign absolute square	2. Present examples on the board of program lines using functions.
	3. Complete and check a worksheet containing built-in functions and the resulting program lines. (Appendix C)
Flowchart Preparation	4. Construct a flowchart for a business problem using math formulas including functions.
Program Coding in BASIC	5. Use the previously constructed flowchart to code the steps of the business problem.
	6. Key the program into the computer.
	7. Debug and rekey the program. The program and its output will be corrected to 100 percent accuracy.
	8. Organize the necessary documentation, including the flowchart, the coded program, and a copy of the output.

---

9. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent subroutines, the GOSUB statement, and the RETURN statement with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Program Development Subroutines, GOSUB, and RETURN	1. View transparencies of problems using subroutines, GOSUB, and RETURN.
	2. Discuss possible problems that would require subroutines.
	3. View transparencies showing flowcharts and resulting programs using subroutines, GOSUB, and RETURN.
	4. Complete and check a worksheet which requires construction of a flowchart for a problem using a subroutine, GOSUB, and RETURN. (Appendix D. Step 1)

Flowchart Preparation	5. Construct a flowchart for a business problem using a subroutine, GOSUB, and RETURN.

---

10. Using a completed flowchart, students will be able to code with at least 75 percent accuracy the program for the problem using subroutines, the GOSUB statement, and the RETURN statement.

Subject Matter Content	Learning Activities
Program coding in BASIC	1. Use the previously constructed flowchart to code the steps of a business problem. (Appendix D, Step 2)
	2. Key the program into the computer.
	3. Debug and rekey the program. Program and its output will be corrected to 100 percent accuracy.
	4. Organize the necessary documentation, including the flowchart, the coded program, and a copy of the output.

---

11. Given a business programming problem, students will be able to deduce the steps in the problem and construct a flowchart using the flowcharting symbols to represent arrays and the DIM statement with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Program Development Arrays and DIM Statements	1. View transparencies of problems using arrays with DIM statements and the resulting flowcharts.
	2. Complete and check a worksheet which requires construction of a flowchart for a problem using an array and a DIM statement. (Appendix E, Step 1)

12. Using a completed flowchart, students will be able to code with at least 75 percent accuracy the program for the problem using arrays and the DIM statement.

Subject Matter Content	Learning Activities
Program coding in BASIC	1. Use the previously constructed flowchart to code the steps of a business problem. (Appendix E, Step 2)
	2. Key the program into the computer.
	3. Debug and rekey the program. Program and its output will be corrected to 100 percent accuracy.
	4. Organize necessary documentation, including the flowchart, the coded program, and a copy of the output.

13. On a written test, students will be able to match with at least 75 percent accuracy the definitions and uses of BASIC, Pascal, COBOL, FORTRAN, LOGO, and RPG languages.

Subject Matter Content	Learning Activities
Programming Languages Definitions and Uses	1. Define and discuss the uses of programming languages.
	2. Prepare index cards with words and definitions related to programming languages.
	3. Work in pairs and compete in a password type of game using the index cards prepared in the previous activity.

14. On a written test, students will be able to list with at least 75 percent accuracy advantages and disadvantages of BASIC, Pascal, COBOL, FORTRAN, LOGO, and RPG languages.

Subject Matter Content	Learning Activities
Programming languages Advantages and Disadvantages	1. Using a handout sheet, discuss in small groups the advantages and disadvantages of selected programming languages. (Appendix F)
	2. From a dictated list of advantages and disadvantages, write the languages described.
	3. Discuss the answers given in Activity 2.
	4. Construct a flowchart for a business problem.
	5. Code the program, using COBOL, FORTRAN, or Pascal.
	6. Debug and rekey the program. The program and its output will be corrected to 100 percent accuracy.

15. Given a problem on a written test, students will be able to construct a flowchart and write the BASIC code to solve the problem with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Construction of a Flowchart and Program Coding in BASIC	1. Construct a flowchart and write the BASIC code to allow inputting three names and printing the three names.
	2. Construct a flowchart and write the BASIC code to allow inputting an answer to a question; have the computer reward correct answers and correct wrong answers.

3. Construct a flowchart and write the BASIC code that will read the number of miles run each day for seven days. Let the subroutine determine the total number of miles run and the average miles run per day. (Use teacher-originated data for a hypothetical runner.)

APPENDIX A

WORKSHEET 1

Directions:

1. Construct a flowchart that would show the steps for printing out the area code, phone number, and the first and last names of three of your friends.

   Sample output:

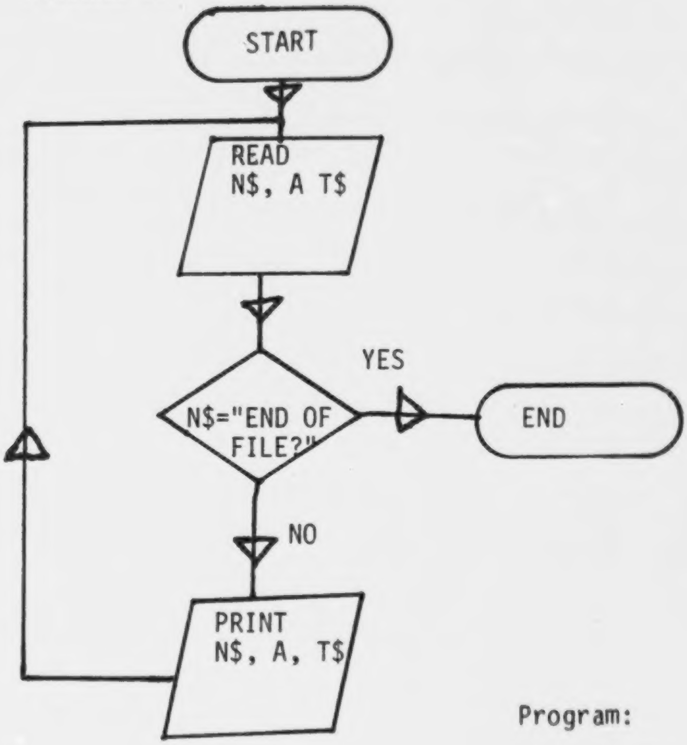
   ```
   F.Name  L.Name  318     478-2138
   F.Name  L.Name  207     589-2313
   F.Name  L.Name  312     763-1487
   ```

2. Based on the completed flowchart, code the BASIC program that provides the required output.

APPENDIX A

ANSWER KEY

Flowchart:


START
READ
N$, A T$
N$="END OF
FILE?"
YES
END
NO
PRINT
N$, A, T$

Program:

```
100 REM This program lists three
110 REM names, area codes, and
130 REM telephone numbers
300 READ N$, A, T$
320 IF N$="End of File" then 390
330 PRINT N$, A, T$
350 GOTO 300
360 DATA "Ann Jones",318,"345-3434"
370 DATA "Sam Smith",314,"342-3332"
375 DATA "Fred Allen",318,"222-3555"
380 DATA "End of File",999,"999-9999"
390 END
```

Output:

```
Ann Jones     318     345-3434
Sam Smith     314     342-3332
Fred Allen    318     222-3555
```

APPENDIX B

WORKSHEET 2

Show the steps used to solve these problems. Follow the rules of the math hierarchy.

1. 3 + 8/2 * 4 - 5

2. 4/2 ↑ 2 - 3 + 6 / 2

3. ((4 * 2) + 8) / 8

4. 9 * (8 + 10) / 2

5. 6 - (3 ↑ 2 + 1) / 5 * 2 + 5

APPENDIX B

ANSWER KEY

Show the steps used to solve these problems. Follow the rules of the math hierarchy.

1. $3 + 8/2 * 4 - 5$

Step 1: $3 + \underline{4 * 4} - 5$

Step 2: $\underline{3 + 16} - 5$

Step 3: $\underset{14}{\underline{19 - 5}}$

2. $4/2 \uparrow 2 - 3 + 6 / 2$

Step 1: $\underline{4/4} - 3 + 6/2$

Step 2: $1 - 3 + \underline{6/2}$

Step 3: $\underline{1 - 3} + 3$

Step 4: $\underset{1}{\underline{-2 + 3}}$

3. $((4 * 2) + 8) / 8$

Step 1: $(8 + 8) / 8$

Step 2: $\underset{2}{\underline{16/8}}$

4. $9 * (8 + 10) / 2$

Step 1: $\underline{9 * 18}/2$

Step 2: $\underset{81}{\underline{162/2}}$

5. $6 - (3 \uparrow 2 + 1) / 5 * 2 + 5$

Step 1: $6 - (\underline{9 + 1}) / 5 * 2 + 5$

Step 2: $6 - \underline{10/5} * 2 + 5$

Step 3: $6 \underline{-2 * 2} + 5$

Step 4: $\underline{6 - 4} + 5$

Step 5: $\underset{7}{\underline{2 + 5}}$

APPENDIX C

WORKSHEET 3

Directions: Write a BASIC statement containing the functions for each of the following results. Assign the result to the variable X.

1. The square root of 25

2. The integer value of -3.4567

3. The rounded-off integer value of 5.6983

4. The sign value of 145.66

5. The sign value of 0

6. The absolute value of -456.33

7. A random number between 100 and 200

8. A random number between -40 and 50

9. The absolute value of the integer value of the square root of 5

10. The sign value of the integer value of the square root of 144

APPENDIX C

ANSWER KEY

Directions: Write a BASIC statement containing the functions for each of the following results. Assign the result to the variable X.

1. The square root of 25

   `X = SQR(25)`

2. The integer value of -3.4567

   `X = INT(-3.4567)`

3. The rounded-off integer value of 5.6983

   `X = INT(5.6893 + .5)`

4. The sign value of 145.66

   `X = SGN(145.66)`

5. The sign value of 0

   `X = SGN(0)`

6. The absolute value of -456.33

   `X = ABS(-456.33)`

7. A random number between 100 and 200

   `X = INT(101 * RND(0) + 100)`

8. A random number between -40 and 50

   `X = INT(91 * RND(0) - 40)`

9. The absolute value of the integer value of the square root of 5

   `X = ABS(INT(SQR(5)))`

10. The sign value of the integer value of the square root of 144

    `X = SGN(INT(SQR(144)))`

APPENDIX D

WORKSHEET 4

Directions:

1. Construct a flowchart for a program to find the pay for two employees, including time and a half for overtime hours (over 40 hours).

   A subroutine should contain the formulas.

   Output:

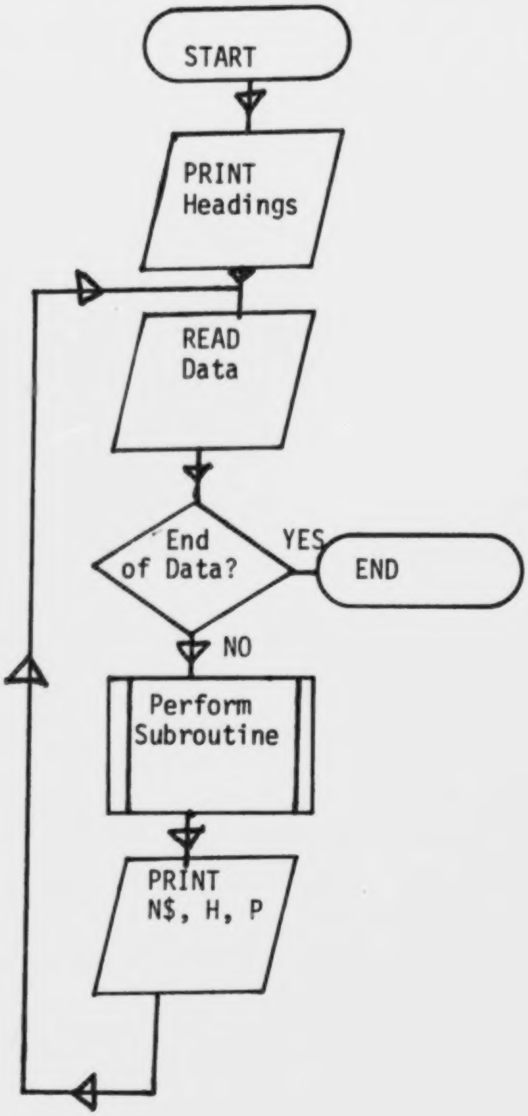
   ```
   Name      Hours      Pay

   Don        43        445

   Joe        37        277.50
   ```

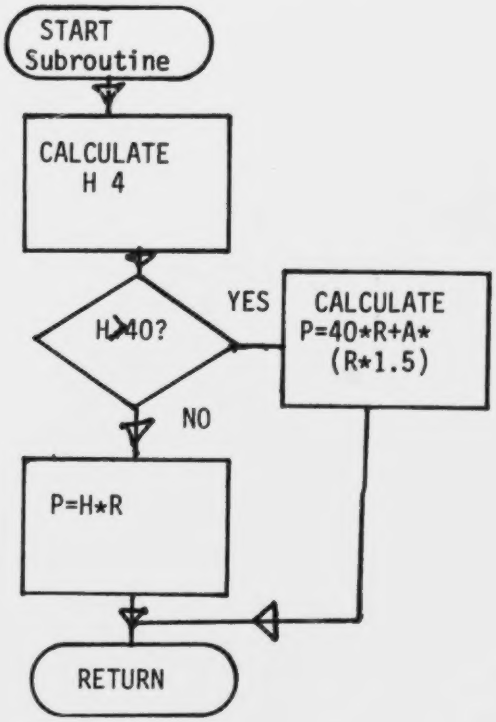
2. Based on the completed flowchart, code a BASIC program that provides the required output.

APPENDIX D, STEP 1

ANSWER KEY

Flowchart:


START
PRINT Headings
READ Data
End of Data?
YES
END
NO
Perform Subroutine
PRINT N$, H, P


START Subroutine
CALCULATE H 4
H>40?
YES
CALCULATE P=40*R+A* (R*1.5)
NO
P=H*R
RETURN

APPENDIX D, STEP 2

ANSWER KEY

Program:

```
 40 REM figures pay for two employees
 50 PRINT "NAME", "HOURS", "PAY"
 55 PRINT
 60 READ N$, H, R
 70 IF N$="END" THEN 999
 80 GOSUB 200
 90 PRINT N$, H, P
110 GOTO 60
130 DATA "DON", 43, 10
140 DATA "JOE", 37, 7.50
150 DATA "END", 0, 0
200 REM Subroutine
210 LET A = H - 40
220 IF H > 40 THEN 250
230 LET P = H * R
240 GOTO 260
250 LET P = 40 * R + A * (R * 1.5)
260 RETURN
270 END
```

APPENDIX E

WORKSHEET 5

Directions:

1. Construct a flowchart for a program that would read five numbers into an array and print the five numbers.

Sample Output:

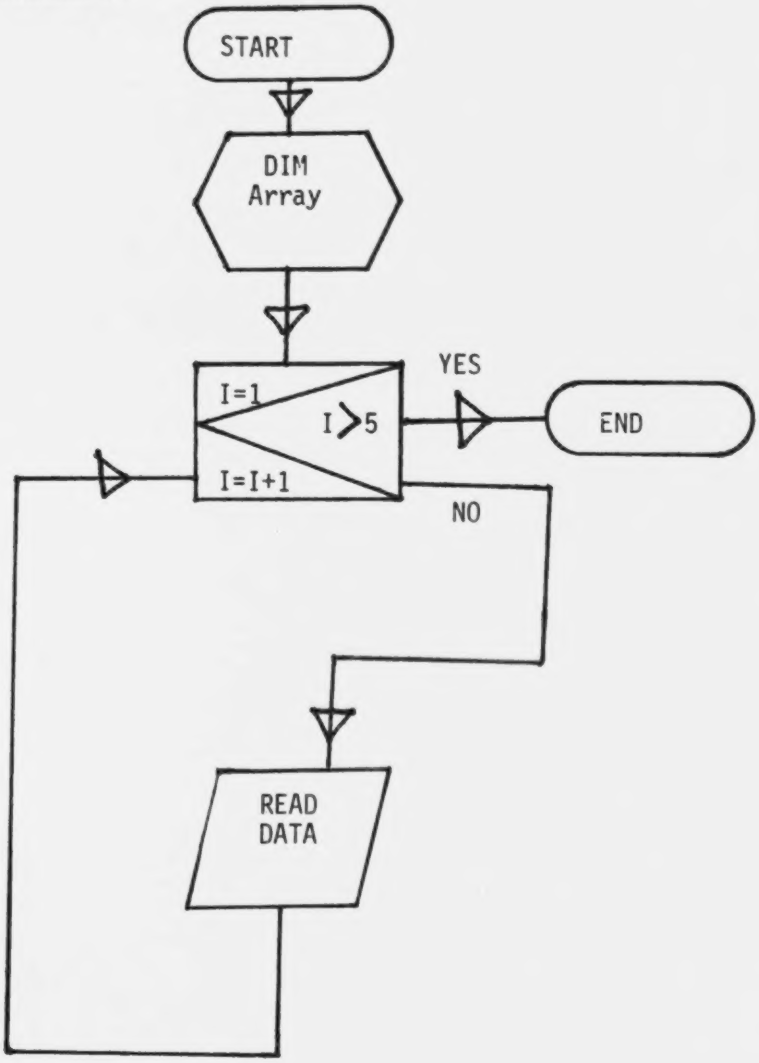
```
1     2     3     4     5
```

2. Based on the completed flowchart, code a BASIC program that provides the required output.

APPENDIX E, STEP 1

ANSWER KEY

Flowchart:


START
DIM
Array
I=1
I>5
I=I+1
YES
END
NO
READ
DATA

300

APPENDIX E, STEP 2

ANSWER KEY

Program:

```
 5 REM five numbers into an array
10 DIM DAY(5)
20 FOR I = 1 to 5
30 READ DAY(I)
40 PRINT I
50 NEXT I
60 DATA 1, 2, 3, 4, 5
99 END
```

APPENDIX F

A COMPARISON OF PROGRAM LANGUAGES

LANGUAGE	APPROPRIATE APPLICATIONS	ADVANTAGES	DISADVANTAGES
BASIC	Personal or Instructional	1. Relatively easy to learn 2. Interactive 3. Will run on systems that are too small for other languages 4. Excellent mathematical capabilities	1. Poor documentation 2. Processing of alphabetic and alphanumeric data is limited 3. Restricted input of data 4. Restricted selection and repetition instructions
COBOL	Commercial	1. English-like and easy to follow 2. Very efficient file processing 3. Faster input/output speeds	1. Wordy and redundant 2. Multiple commands 3. Coding difficulty 4. Large compiler
FORTRAN	Scientific, mathematical, engineering	1. Formulas and mathematical operations can be written easily 2. Programs containing many calculations run rapidly 3. Excellent logic capability	1. Processing of non-numeric data is cumbersome and complicated 2. Editing of reports is difficult
RPG	Commercial	1. Relatively easy to learn 2. Produces reports easily	1. Very limited mathematical capability 2. Rigid coding rules

A COMPARISON OF PROGRAM LANGUAGES continued

LANGUAGE	APPROPRIATE APPLICATIONS	ADVANTAGES	DISADVANTAGES
LOGO	Educational	1. Relatively easy for young children to learn 2. Produces screen graphics, processes data, and creates files 3. Teaches programming concepts that can be applied to any programming language 4. Teaches children how to interact with a computer	1. Limited applications 2. Particularly suited to students in the younger age groups 3. Limited software available
PASCAL	Scientific and business	1. Relatively easy to learn 2. Embodies structured programming instructions 3. Excellent documentation	1. Precise rules for punctuation 2. Sequential files 3. Editing of reports is difficult

UNIT TEST

PROGRAMMING

A. SHORT ANSWER

Directions: List the steps in the RUN, SAVE, and LOAD procedures of a program.

Run-1.
2.
3.

Save-1.
2.
3.

Load-1.
2.
3.

B. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents your answer in the space next to each item.

Column A	Column B
_____1. A programming language that is written in English-like statements.	A. BASIC
_____2. One of the first major programming languages developed which offers ease of use with structured programming.	B. COBOL
_____3. A programming language designed for small scale computer systems for generating business reports.	C. FORTRAN
_____4. A high-level programming language useful for scientific, engineering, and mathematics applications.	D. LOGO
_____5. A programming language widely used on personal computers and small business computer systems.	E. PASCAL
_____6. A programming language designed for young children.	F. RPG

C. SHORT ANSWER

Directions: List one advantage and one disadvantage for each of the following programming languages.

BASIC-

Pascal-

COBOL-

FORTRAN-

LOGO-

RPG-

D. FLOWCHART AND PROGRAM

Directions: Construct a flowchart and code a program that would read a pair of numbers and add, subtract, multiply, and divide each pair.

Use a subroutine to do the math.

Data to be used: 5, 4, 3, 2, -999, 1

Sample Output:

```
Add     Subtract     Multiply     Divide

9          1            20          1.25

5          1             6          1.5
```

UNIT TEST

ANSWER KEY

A. SHORT ANSWER

Directions: List the steps in the RUN, SAVE, and LOAD procedures of a program.

RUN- 1. Key in program.
2. Enter RUN command.
3. Results will be presented.

SAVE-1. Enter SAVE command and a file name.
2. This procedure will record a program currently in main memory to disk.

LOAD-1. Enter LOAD command and file name.
2. This procedure will retrieve from disk and load to primary memory a program that has been saved to disk.
3. The purpose of this LOAD command is to allow the programmer to bring into memory a program that is to be updated.

B. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents your answer in the space next to each item.

Column A

B 1. A programming language that is written in English-like statements.

E 2. One of the first major programming languages developed which offers ease of use with structured programming.

F 3. A programming language designed for small scale computer systems for generating business reports.

C 4. A high-level programming language useful for scientific, engineering, and mathematics applications.

A 5. A programming language widely used on personal computers and small business computer systems.

D 6. A programming language designed for young children.

Column B

A. BASIC
B. COBOL
C. FORTRAN
D. LOGO
E. PASCAL
F. RPG

C. SHORT ANSWER

Directions: List one advantage and one disadvantage of each of the following programming languages.
(Credit will be given for any one advantage--disadvantage.)

BASIC-

Advantages:

1. Relatively easy to learn
2. Interactive
3. Will run on systems that are too small for other languages
4. Excellent mathematical capabilities

Disadvantages:

1. Poor documentation
2. Processing of alphabetic data is limited.
3. Restricted input of data
4. Restricted selection and repetition instructions

Pascal-

Advantages:

1. Relatively easy to learn
2. Embodies structured programming instructions
3. Excellent documentation

Disadvantages:

1. Precise rules for punctuation
2. Sequential files
3. Editing of reports is difficult

COBOL-

Advantages:

1. English-like and easy to follow
2. Very efficient file processing
3. Faster input/output speeds

Disadvantages:

1. Wordy and redundant
2. Multiple commands
3. Coding difficulty
4. Large compiler

FORTRAN-

Advantages:

1. Formulas and mathematical operations can be written easily
2. Programs containing many calculations run rapidly
3. Excellent logic capability

Disadvantages:

1. Processing of non-numeric data is cumbersome and complicated
2. Editing of reports is difficult

UNIT TEST continued

LOGO-

Advantages:

1. Relatively easy for young children to learn
2. Produces screen graphics, processes data, and creates files
3. Teaches programming concepts that can be applied to any programming language
4. Teaches children how to interact with a computer

Disadvantages:

1. Limited applications
2. Particularly suited to students in the younger age groups
3. Limited software available

RPG-

Advantages:

1. Relatively easy to learn
2. Produces reports easily

Disadvantages:

1. Very limited mathematical capability
2. Rigid coding rules

D. FLOWCHART AND PROGRAM

Directions: Construct a flowchart and a program that would read a pair of numbers and add, subtract, multiply, and divide each pair.

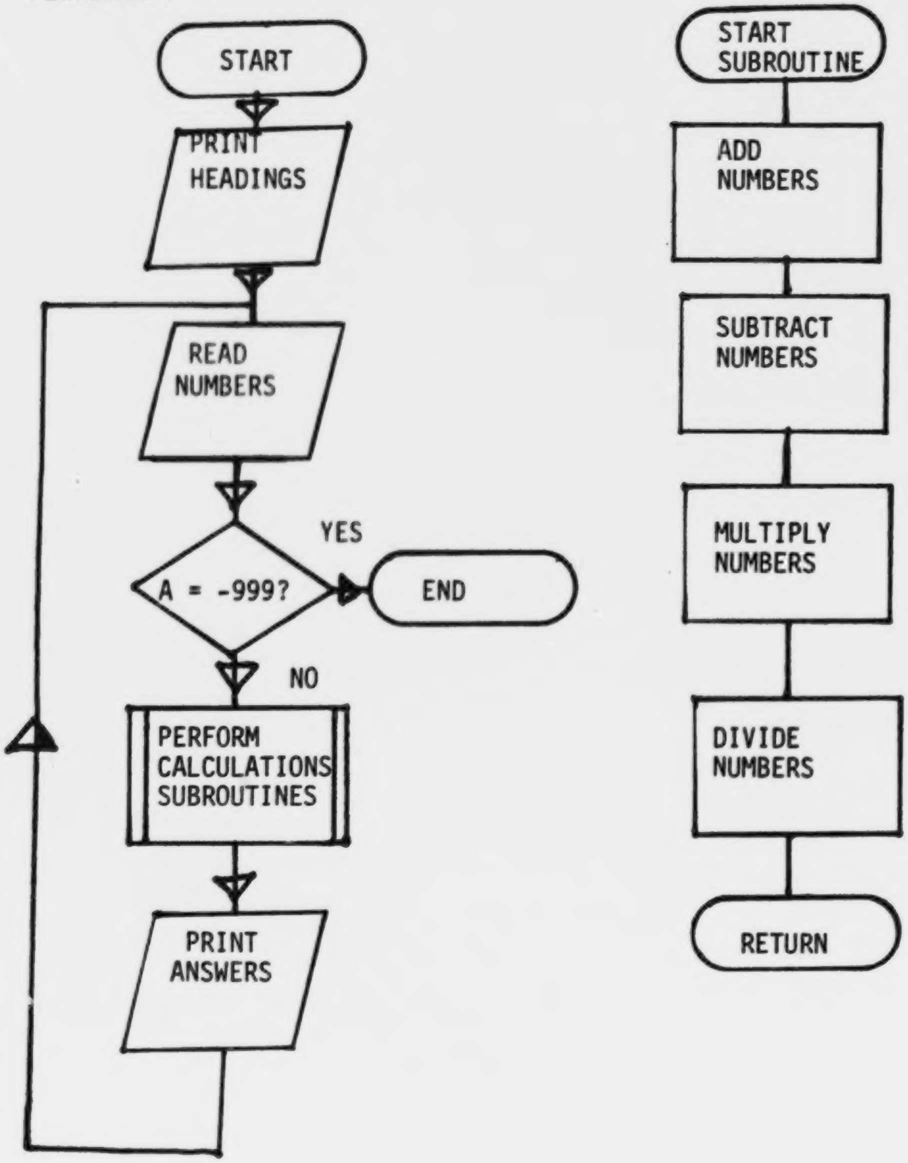
Use a subroutine to do the math.

Data to be used: 5, 4, 3, 2, -999, 1

Sample Output:

Add	Subtract	Multiply	Divide
9	1	20	1.25
5	1	6	1.5

FLOWCHART:


START
PRINT HEADINGS
READ NUMBERS
A = -999?
YES
END
NO
PERFORM CALCULATIONS SUBROUTINES
PRINT ANSWERS
START SUBROUTINE
ADD NUMBERS
SUBTRACT NUMBERS
MULTIPLY NUMBERS
DIVIDE NUMBERS
RETURN

UNIT TEST continued

PROGRAM:

```
 30 PRINT "ADD", "SUBTRACT", "MULTIPLY", "DIVIDE"
 40 READ A, B
 45 IF A = -999 THEN 999
 50 GOSUB 100
 55 PRINT
 60 PRINT AD, SU, MU, DI
 70 GOTO 40
 80 DATA 5, 4, 3, 2, -999, 1
100 REM subroutine
110 LET AD = A + B
120 LET SU = A - B
130 LET MU = A * B
140 LET DI = A/B
150 RETURN
999 END
```

EVALUATION AND TESTING

Ways to Evaluate Pupil Growth

- Class notebook
- Flowcharts
- Math problems
- Programs
- Unit Test

EQUIPMENT AND SUPPLIES

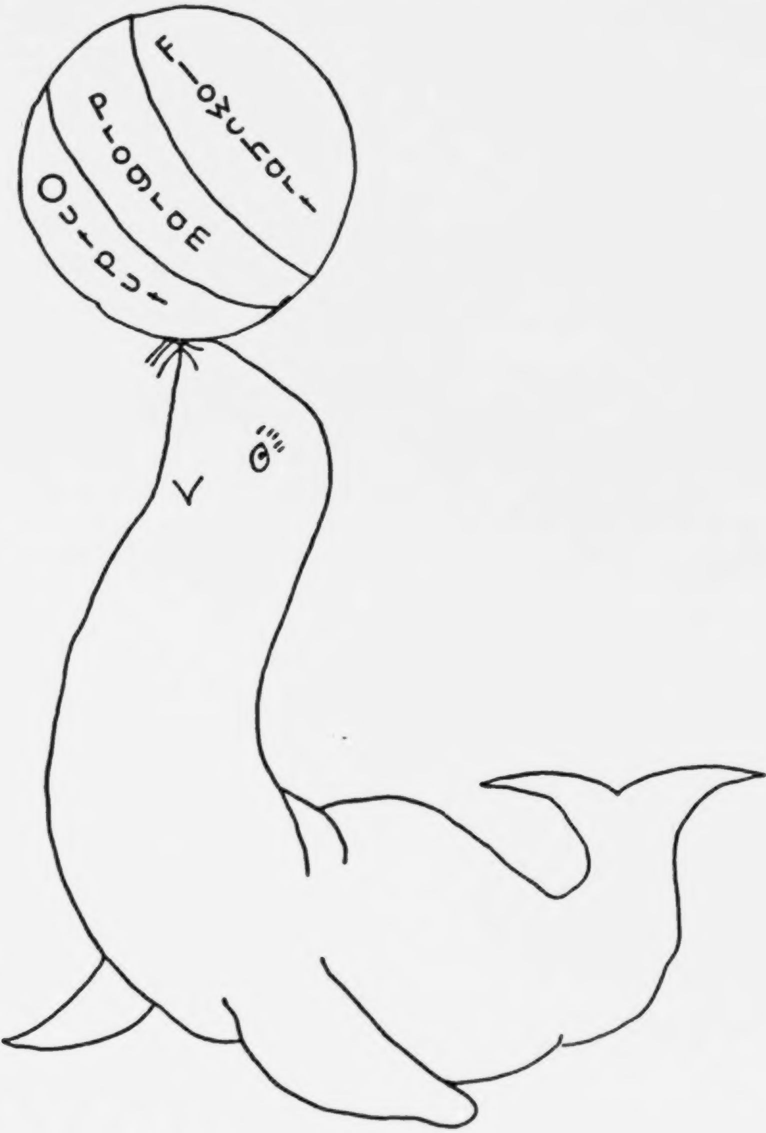
Student

Textbook
Notebook
Worksheets
Computer Dictionary
Template
Pencil or Pen
Eraser
Computers

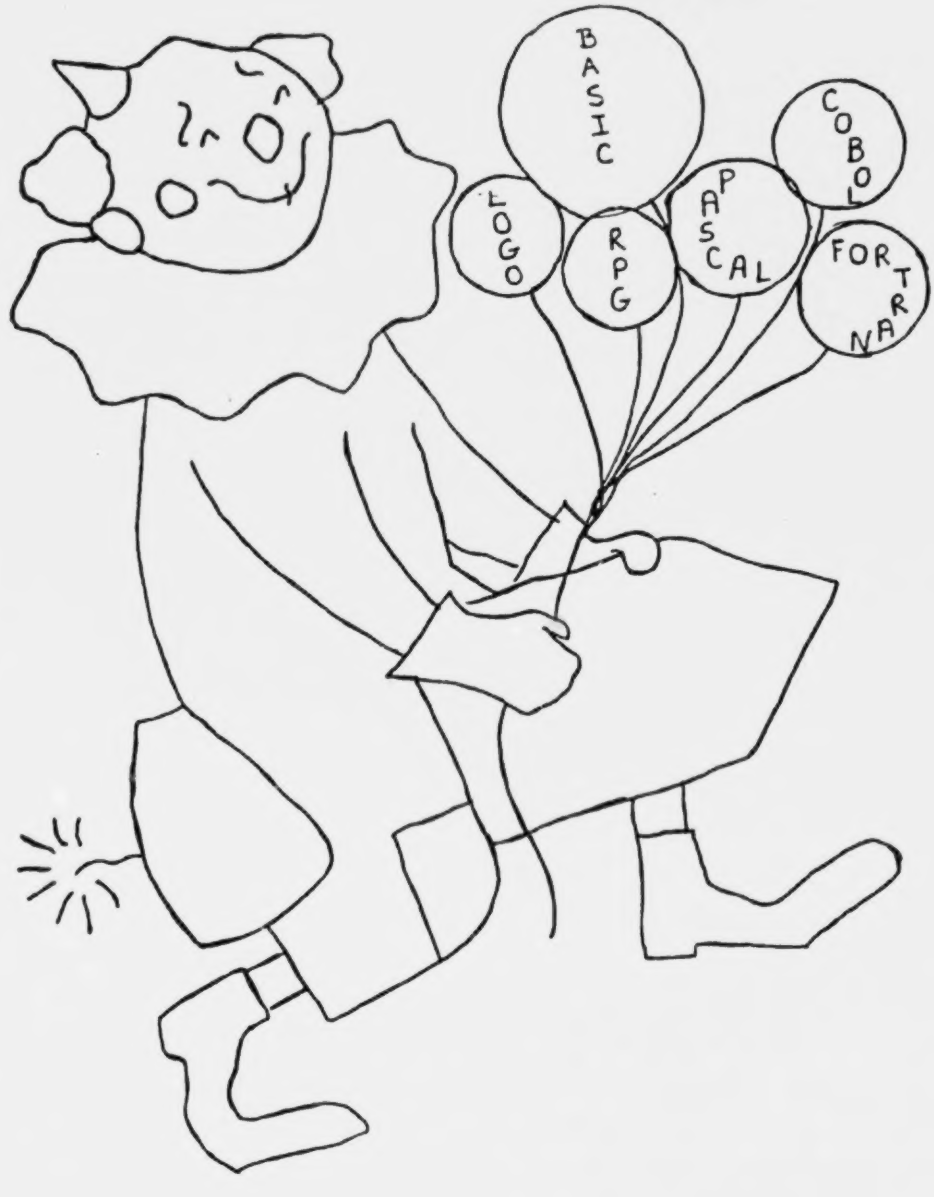
Teacher

Textbook and Manual
Operator's Manual
Periodicals
Worksheets
Handouts
Computer Dictionary
Template
Computers
Bulletin Board Supplies
Overhead Projector
Transparencies

JOIN THE ACT OF GOOD DOCUMENTATION


Flowchart
Program
Output

STOP CLOWNING AROUND AND LEARN ABOUT PROGRAMMING LANGUAGES


BASIC
COBOL
LOGO
RPG
PASCAL
FORTRAN

SUPPLEMENTARY MATERIALS

Duplicating Masters

Ruby & Roberts. *Micro 3: Progress with BASIC* 03-5558-K5
Ruby & Roberts. *Micro 4: Programs in BASIC* 03-5561-K5
Ruby & Roberts. *Micro 5: Reviewing and Debugging* 09-5563-K5
Ruby & Roberts. *Micro 6: Editing* 09-5565-K5
Ruby & Roberts. *Micro 7: Structured Programs* 09-5569-K5
J. Weston Walch, Publisher
P. O. Box 658
Portland, Maine 04104-0658

Filmstrips/Cassettes

Advanced BASIC Techniques. (Four filmstrips, four cassettes, and teacher's handbook) EX 384
Career Aids, Inc.
20417 Nordhoff St., Dept U
Chatsworth, CA 91311

Computer Programming in BASIC. 075 (#6 From Start to Finish--Complete Basic Programming)
Bergwall Productions, Inc.
P. O. Box 238
Garden City, NY 11530-0238
800-645-3565

Introduction to Programming. DX1084 (Five Color Filmstrips, Five Cassettes, Program Guide)
Prentice-Hall Media
ServCode DX
150 White Plains Road
Tarrytown, NY 10591

Programming in BASIC. (Three Color Filmstrips, Three Cassettes, Program Guide)
Prentice-Hall Media
ServCode DX
150 White Plains Road
Tarrytown, NY 10591

Programming Languages--BASIC. RMI 6352
RMI Media Productions, Inc.
120 West 72nd Street
Kansas City, MO 64114

Periodicals

Apple Orchard
P. O. Box 1493
Beaverton, OR 97075

Byte
P. O. Box 590
Martinville, NJ 08836

Computer Career News
Computer Career News Publishing Company
Box 1005
Oradell, NJ 07649

Creative Computing
P. O. Box 789-M
Morristown, NJ 07960

Home Computer
Emerald Valley Publishing Company
P. O. Box 70288
Eugene, OR 97401

Nibble
P. O. Box 325
Lincoln, MA 01773

Run
CW Communication/Peterborough, Inc.
80 Pine Street
Peterborough, NH 03458

T.H.E. Journal
P. O. Box 992
Acton, MA 01720

The Transactor
Transactor Publishing Company
500 Steeles Avenue
Milton, Ontario, Canada, L9T 3P7

Software

Graphic Software for Microcomputers
(Available for Apple, IBM PC, and TRS-80)
QUEUE, Inc.
5 Chapel Hill Drive
Fairfield, CT 06432
1-800-232-2224

PASCAL: Beginning Examples
(Apple disk)
QUEUE, Inc.
5 Chapel Hill Drive
Fairfield, CT 06432
1-800-232-2224

The Apple's Core Part II: The Seed
(Apple disk)
QUEUE, Inc.
5 Chapel Hill Drive
Fairfield, CT 06432
1-800-232-2224

Textbooks

Belford, G., and C. L. Liu. PASCAL. New York: McGraw-Hill Book Company, 1984.
Computer Marketing Services
S1
Hightstown/Princeton Road
Hightstown, NJ 08520

Blackwood and Blackwood. Apple Fortran. Indianapolis: Bobbs-Merrill Educational Publishing Company, 1982.
Dept 862
4300 W. 62nd Street
Indianapolis, IN 46206

Coburn, Edward J. Microcomputers: Hardware, Software, and Programming. Indianapolis: Bobbs-Merrill Educational Publishing, 1984.
4300 W. 62nd Street
P. O. Box 7080
Indianapolis, IN 46201

Couger, J. Daniel, and Fred R. McFadden. First Course in Data Processing with BASIC. 2nd Edition. New York: John Wiley & Sons, Inc., 1981.
605 Third Avenue
New York, NY 10158

Lien, David A. Learning TRS-80 Model 4/4P BASIC. San Diego: CompuSoft Publishing, 1984.

Luehrmann, A., and H. D. Peckham. Apple PASCAL. New York: McGraw-Hill Book Company, 1982.
Computer Marketing Services
S1
Hightstown/Princeton Road
Hightstown, NJ 08520

Mandell, Steven L. Computers and Data Processing Today. St. Paul: West Publishing Company, 1983.
50 West Kellogg Boulevard
P. O. Box 3526
St. Paul, MN 55164

Mandell, Steven L. Computers and Data Processing Today with Pascal. St. Paul: West Publishing Company, 1983.
50 West Kellogg Boulevard
P. O. Box 3526
St. Paul, MN 55164

Mandell, Steven L. Introduction to Computers Using the Apple II. St. Paul: West Publishing Company, 1985.
50 West Kellogg Boulevard
P. O. Box 43526
St. Paul, MN 55165

McLeod, Raymond, Jr., and Irvine Forkner. Computerized Business Information Systems: An Introduction to Data Processing. John Wiley & Sons, Inc., 1982.
605 Third Avenue
New York, NY 10158

Parker, Alan J., and John F. Stewart. Apple Basic for Business: Basic Programming and VisiCalc. 2nd Edition. Reston Publishing Company, Inc., 1984.
Division of Prentice-Hall
11480 Sunset Hills Road
Reston, VA 22090

Spencer, Donald S. Principles of Information Processing. Charles E. Merrill Publishing Company, 1985.
1300 Alum Creek Drive
Columbus, OH 43216

The Brain Bank. The BASIC Conversions Handbook for Apple, TRS-80, and PET Users. Cat. #5534
Hayden Book Company, Inc.
Dept. #C4
10 Mulholland Drive
Hasbrouck Heights, NJ 07604

SUPPLEMENTARY MATERIALS continued

Transparencies

Introduction to Basic Programming. (Transparency masters and teacher's guide)
Anaheim Publishing Company
2632 Saturn St.
Brea, CA 92621

Introduction to Computers and Data Processing. (Transparency masters and teacher's guide)
Anaheim Publishing Company
2632 Saturn St.
Brea, CA 92621

Videocassettes

Computer Education/Programming/Operations.
RMI Media Productions, Inc., 1984.
2807 West 47th Street
Shawnee Mission, KS 66205
(User may purchase the 3/4" U-Matic cassette.)

RESOURCES

Aandahl, Vaughan, and Ruth Hoffman. *Introduction to PASCAL*. Denver: Love Publishing Co., 1983.

Callum, Iain. *Pascal for the Apple*. Tarrytown, NY: Prentice-Hall Media, 1983.

Cashman, Thomas J., and Gary B. Shelly. *Introduction to BASIC Programming*. Brea, CA: Anaheim Publishing Company, 1983.

Clark, James F., and William O. Drum. *Structured BASIC*. Cincinnati: South-Western Publishing Company, 1983.

Graves, Robert T. *TRS-80 COBOL*. Tarrytown, NY: Prentice-Hall Media, 1983.

Jennings, Carol Ann. *BASIC Programming*. Developed in cooperation with the Arkansas Vocational and Technical Education Division of the Arkansas Department of Education, 1982.

Jennings, Carol Ann, and Sandy McDonald. *Information Processing*. Developed by the Mid-America Vocational Curriculum Consortium, Inc., 1981.

National Information Center for Educational Media, (NICEM), *Index to Educational Audio Tapes*, University of Southern California, 5th Ed., 1980.

National Information Center for Educational Media, (NICEM), *Index to 16mm Educational Films*, University of Southern California, 7th Ed., 1980.

Parker, Alan J., and John F. Stewart. *Apple BASIC for Business for the Apple II*. 2nd ed. Tarrytown, NY: Prentice-Hall Media, 1984.

Shane, June Grant. *Programming for Microcomputers Apple II BASIC*. Boston: Houghton Mifflin Co., 1983.

Schnoke, Marilyn. *The World of Computers and Data Processing*. St. Paul: West Publishing Company, 1985.

Willen, David C. *BASIC Programming With the IBM PC Jr*. Indianapolis: Bobbs-Merril Educational Publishing, 1984.

Zabinski, Michael. *Introduction to TRS-80 Level II BASIC and Computer Programming*. Tarrytown, NY: Prentice-Hall Media, 1980.

UNIT X

ADVANCED SOFTWARE APPLICATIONS

INTRODUCTION

In recent years the use of prewritten application software packages has increased rapidly. The popularity of microcomputers and the cost of developing application software are the main reasons for prewritten packages. The growing popularity of software packages can also be attributed to their wide variety of uses in the home environment.

The purpose of this unit is to allow the students to become more familiar with the various software packages as well as to gain additional experience in using one of the software packages available.

COMPETENCIES

1. Produce hard copy reports that demonstrate the various capabilities of the available software.
2. Demonstrate familiarity with available integrated software packages.

GENERAL PERFORMANCE OBJECTIVES/GOALS

1. Practice the entering and manipulating of data using one or more types of application software.
2. Identify and use an integrated software program.

SPECIFIC PERFORMANCE OBJECTIVES AND MASTERY CRITERIA

1. At the terminal, students will be able to create a data base file using the available software and hardware with 100 percent accuracy.
2. Given records in class, students will be able to enter records with at least 75 percent accuracy into a data base file.
3. Students will be able to update records in a data base file with 100 percent accuracy.
4. Students will be able to search for specified records within a data base field with 100 percent accuracy.

5. Students will be able to sort records within a data base according to specified fields.

6. Students will be able to create and enter the formulas necessary to perform calculations in a data base program.

7. Students will be able to design and print specified reports from a data base with 100 percent accuracy.

8. Given information in class, students will be able to enter primary and column headings (labels) in a spreadsheet with 100 percent accuracy using the available software and hardware.

9. Given an assignment in class, students will be able to enter data in proper rows and columns in a spreadsheet, with 100 percent accuracy.

10. Given an assignment in class, students will be able to enter the appropriate formulas to perform math computations necessary to solve the problem with 100 percent accuracy.

11. Students will be able to update an existing spreadsheet with 100 percent accuracy by adding, deleting, or moving rows and/or columns.

12. Students will be able to fix titles horizontally and vertically with 100 percent accuracy.

13. Students will be able to incorporate special functions correctly, such as count, sum, average, maximum, and minimum, in an existing worksheet with 100 percent accuracy.

14. Students will be able to replicate (copy) labels or formulas with 100 percent accuracy.

15. Students will be able to demonstrate the order of recalculation with 100 percent accuracy.

16. Students will be able to demonstrate the differences between forward and circular references with 100 percent accuracy.

17. Students will be able to print spreadsheet reports with 100 percent accuracy.

18. Students will be able to print specified reports from the data base of an integrated software package to the word processor with 100 percent accuracy.

19. Students will be able to print specified reports from the spreadsheet of an integrated software package to the word processor with 100 percent accuracy.

20. Students will be able to merge a report from the data base and the spreadsheet of an integrated software package to the word processor with 100 percent accuracy.

21. Students will be able to edit with 100 percent accuracy a specified report that was transferred from the data base or the spreadsheet of an integrated software package to the word processor.

22. Given material related to data bases, spreadsheets and integrated software packages on a written test, students will be able to define terms correctly with at least 75 percent accuracy.

23. On a written test, students will be able to identify and describe the advantages of a comprehensive integrated software package with at least 75 percent accuracy.

METHODOLOGY

The purpose of this unit is to continue working with data base and spreadsheet packages. Activities will also be provided to acquaint students with integrated software programs.

Books, operators' manuals, training manuals, and periodicals listed in the supplementary materials section of this unit may be used to gather the topical information needed for the presentation of this unit.

SUGGESTED INTEREST APPROACHES

1. Have students prepare bulletin board displays to cover important aspects of this unit.

2. Display a collection of reports generated by the principal business software packages.

3. Display a collection of advertising materials representing the principal business software packages.

UNIT OUTLINE

ADVANCED SOFTWARE APPLICATIONS

I. Data Base

   A. Creating the file
   B. Designing layout
   C. Entering data
   D. Updating records

E. Searching for specified records
F. Sorting records
G. Creating and entering formulas
H. Designing reports
I. Printing reports

II. Spreadsheet

A. Entering headings and data
B. Creating and entering formulas
C. Inserting columns and rows
D. Moving columns and rows
E. Fixing titles
F. Using special functions
G. Replicating
H. Recalculating
I. Referencing
J. Printing reports

III. Integrated Software

A. Definition
B. Advantages and disadvantages
C. Report printing
E. Report merging
F. Report editing

SPECIFIC PERFORMANCE OBJECTIVES AND LEARNING ACTIVITIES

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1. At the terminal, students will be able to create a data base file using the available software and hardware with 100 percent accuracy.

Subject Matter Content	Learning Activities
Data Base Creating the file	1. Review by reading from the manual the instructions for creating a data base file.
	2. Create at the terminal a data base file consisting of the name, address, telephone number, and grade level of each member of the class.

2. Given records in class, students will be able to enter records with at least 75 percent accuracy into a data base file.

Subject Matter Content	Learning Activities
Data Base Entering data	1. Review by reading in the manual the instructions for entering records in a data base file. 2. Enter the name, address, telephone number, and grade level of each member of the class. (Appendix A, Step 1)

3. Students will be able to update records in a data base file with 100 percent accuracy.

Subject Matter Content	Learning Activities
Data Base Updating records	1. View a demonstration on the steps for updating records in a data base file. 2. Update the FBLA file that was created during the first semester by making the necessary changes in phone number, address, and class schedule of each member. 3. Enter participation points for each FBLA member. (Appendix B) 4. Enter homework point values for the class members. (Appendix A, Step 2)

4. Students will be able to search for specified records within a data base field with 100 percent accuracy.

Subject Matter Content	Learning Activities
Data Base Searching for records	1. Review by reading in the manual the steps to search for specified records in a data base file.

2. Search and find the records of a given number of names included in the FBLA file.
3. Search and find the records of a given number of names included in the class file.

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5. Students will be able to sort records within a data base according to specified fields.

Subject Matter Content	Learning Activities
Data Base Sorting records	1. View a demonstration on the steps for sorting records within a data base file. 2. Using the class data base file, sort records according to last name, grade level, and sex. 3. Using the FBLA data base file, sort records according to last name.

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6. Students will be able to create and enter the formulas necessary to perform calculations in a data base program.

Subject Matter Content	Learning Activities
Data Base Creating and entering formulas	1. View a demonstration on the procedures for creating and entering formulas in a data base file. 2. Create and enter the formulas necessary to tally the number of homework points each student earned during the grading period. 3. Create the formulas necessary to tally the number of participation points each FBLA member earns during the school year.

7. Students will be able to design and print specified reports from a data base with 100 percent accuracy.

Subject Matter Content	Learning Activities
Data Base Designing reports and Printing reports	1. Review by reading from the manual the steps in designing and printing reports in a data base file. 2. Design a report that consists of a title and the first and last names of all FBLA members; rank the names in order according to the number of participation points earned. 3. Prepare the printer for printing a copy of the report. 4. Print a copy of the FBLA report. 5. Design a report that consists of the last and first names of all class members and their homework points earned. Plan to print the names in alphabetical order by last name. 6. Print a copy of the class report.

8. Given information in class, students will be able to enter primary and column headings (labels) in a spreadsheet with 100 percent accuracy using the available software and hardware.

Subject Matter Content	Learning Activities
Spreadsheet Entering headings and data	1. View a demonstration of the steps necessary to enter headings in a spreadsheet. 2. Enter primary and column headings on a spreadsheet for the FBLA fund-raising drive. (Appendix C, Step 1)

9. Given an assignment in class, students will be able to enter data in proper rows and columns in a spreadsheet with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Entering headings and data	1. Read from the manual the instructions for entering values in rows and columns on a spreadsheet.
	2. Enter values in the proper columns and rows on the spreadsheet for the FBLA fund-raising drive. (Appendix C, Step 2)

10. Given an assignment in class, students will be able to enter the appropriate formulas to perform math computations necessary to solve the problem with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Creating and entering formulas	1. View a demonstration on the steps necessary for entering math computations on a spreadsheet.
	2. Enter formulas on the spreadsheet for the FBLA fund-raising drive. (Appendix C, Step 3)

11. Students will be able to update an existing spreadsheet with 100 percent accuracy by adding, deleting, or moving rows and/or columns.

Subject Matter Content	Learning Activities
Spreadsheet Inserting columns and rows Moving columns and rows	1. View a demonstration on the steps necessary to update an existing spreadsheet.
	2. Add columns and/or rows to the FBLA fund-raising drive spreadsheet. (Appendix C, Step 4)

3. Delete columns and/or rows on the FBLA fund-raising drive spreadsheet. (Appendix C, Step 5)

4. Move columns and/or rows on the FBLA fund-raising drive spreadsheet. (Appendix C, Step 6)

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12. Students will be able to fix titles horizontally and vertically with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Fixing titles	1. Read from the manual the steps necessary for fixing titles on a spreadsheet. 2. Fix titles on the FBLA fund-raising drive spreadsheet. (Appendix C, Step 7)

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13. Students will be able to incorporate special functions correctly, such as count, sum, average, maximum, and minimum, in an existing worksheet with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Using special functions	1. Read from the manual the steps necessary for incorporating special functions in an existing spreadsheet. 2. Count the number of students participating in the FBLA fund-raising drive. 3. Total the sales for each day of the FBLA fund-raising drive. Totals should be recorded in row 10. 4. Average each day's sales during the FBLA fund-raising drive. Averages should be recorded in row 12. 5. List the maximum and minimum of each day's sales during the FBLA fund-raising drive.

14. Students will be able to replicate (copy) labels or formulas with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Replicating	1. Read from the manual the instructions for replicating. 2. Replicate formulas to calculate each member's total sales for the week (Column G) and weekly average (Column H). 3. Replicate labels for an additional week of fund-raising activities, using the existing spreadsheet. 4. Enter data for the second week of the fund-raising campaign. (Appendix C, Step 8) 5. Replicate all necessary formulas and special functions for an additional week of fund-raising activities, using the existing spreadsheet.

15. Students will be able to demonstrate the order of recalculation with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Recalculating	1. Read from the manual the steps necessary to demonstrate the order of recalculation. 2. Practice demonstrating recalculation. 3. Demonstrate recalculation to another student.

16. Students will be able to demonstrate the differences between forward and circular references with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Referencing	1. View a demonstration of forward and circular referencing on a spreadsheet. 2. Practice demonstrating differences between forward and circular references. 3. Demonstrate the differences to another student.

17. Students will be able to print spreadsheet reports with 100 percent accuracy.

Subject Matter Content	Learning Activities
Spreadsheet Printing reports	1. View a demonstration of the steps necessary to print a spreadsheet. 2. Prepare the printer for printing a copy of the report. 3. Print a report of the first week of the FBLA fund-raising drive. 4. Print a report of the entire two weeks of the fund-raising drive.

18. Students will be able to print specified reports from the data base of an integrated software package to the word processor with 100 percent accuracy.

Subject Matter Content	Learning Activities
Integrated Software	1. Read from the manual the procedures for reporting from the data base to the word processor.

	2. In a letter to the district FBLA coordinator prepared on the word processor, print a listing of all the club members using the FBLA data base file.

---

19. Students will be able to print specified reports from the spreadsheet of an integrated software package to the word processor with 100 percent accuracy.

Subject Matter Content	Learning Activities
Integrated Software	1. Read from the manual the procedures for reporting from the spreadsheet to the word processor.
	2. In a memo to the club officers prepared on the word processor, print a report of the results of the first week of the FBLA fund-raising drive using the spreadsheet file prepared earlier.

---

20. Students will be able to merge a report from the data base and the spreadsheet of an integrated software package to the word processor with 100 percent accuracy.

Subject Matter Content	Learning Activities
Integrated Software	1. View a demonstration on the procedures to merge files to the word processor from the data base and spreadsheet.
	2. Prepare a letter to all the FBLA members on the word processor from the data base file and merge in the report from the FBLA fund-raising file spreadsheet.

---

21. Students will be able to edit with 100 percent accuracy a specified report that was transferred from the data base or the spreadsheet of an integrated software package to the word processor.

Subject Matter Content	Learning Activities
Integrated Software	1. View a demonstration on the procedures to edit reports that were already created on a previous file. 2. Load the word processor file created in objective No. 20 and edit it by removing the daily average from the spreadsheet portion of the file.

---

22. Given material related to data bases, spreadsheets and integrated software packages on a written test, students will be able to define terms correctly with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Data Base Spreadsheet Integrated Software	1. Define and discuss the uses of data base, spreadsheet, and integrated software. 2. Prepare index cards with words and definitions related to data base, spreadsheet, and integrated software. 3. Using the index cards, work in two groups to compete for points to give the correct definitions of the terms.

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23. On a written test, students will be able to identify and describe the advantages of a comprehensive integrated software package with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Integrated Software	1. Discuss in small groups integrated software packages, and make a list

of the advantages and disadvantages.

2. Working with the list from Activity 1, discuss in class the advantages and disadvantages.

3. Compare written documentation of capabilities of various integrated and nonintegrated packages.

APPENDIX A*

CLASS DATA BASE

Directions: Complete the steps below as directed by the teacher. Ask the teacher to check the completion of each step before proceeding.

1. Enter the information below in a data base for the class.

Melody Dufrene
128 Baker Street
Thibodaux, LA 70301
504 447-1029
Sophomore

Jason Williams
321 Park Drive
Thibodaux, LA 70301
504 448-1186
Sophomore

Lynn Davis
2817 Canal Boulevard
Thibodaux, LA 70302
504 447-6173
Sophomore

Sandra Benoit
630 Highway 307
Thibodaux, LA 70301
504 447-6489
Junior

Mark Boudreaux
318 St. Charles
Thibodaux, LA 70302
504 446-1234
Junior

Susan Matlock
982 E. Fifth Street
Thibodaux, LA 70301
504 448-9816
Junior

Steven Wurzlow
Route 2, Box 17A
Thibodaux, LA 70301
504 448-8880
Junior

Molly Morgan
918 St. Patrick Highway
Thibodaux, LA 70302
504 446-2214
Sophomore

*To make this project more useful, substitute actual names, addresses, and telephone numbers of class members.

2. Enter the homework point values for the class members.

Name	Hwk 1	Hwk 2	Hwk 3	Hwk 4	Hwk 5	Hwk 6
Melody	10	10	10	10	10	10
Jason	5	4	6	4	4	0
Lynn	9	8	10	10	9	8
Sandra	9	7	6	10	5	9
Mark	0	6	0	10	8	9
Susan	8	7	8	8	7	9
Steven	7	8	9	10	8	10
Molly	8	7	9	10	9	10

APPENDIX B

FBLA DATA BASE

Directions: Enter participation points for each FBLA member. Use the information below if you do not have a data base file of actual FBLA members for your school.

Name	Meetings	Office or Committees	Service	Fund-Raising	District	State
Susan	10	10	8	10	5	5
Sandra	10	8	7	6	0	0
William	10	10	9	9	0	0
Frank	5	6	10	6	0	3
Tommy	7	6	8	7	5	0
Dennis	10	8	10	10	5	5
Dana	7	8	8	9	5	0
Winnie	7	8	10	9	5	3
Sally	10	8	7	8	5	3
Beth	10	5	10	8	5	0
Patricia	10	5	6	7	5	3
Karen	10	5	8	6	0	0

APPENDIX C

SPREADSHEET APPLICATION

Directions: Load the available spreadsheet software to bring an empty spreadsheet form to the screen. Complete the steps below as directed by the teacher. Ask the teacher to check the completion of each step before proceeding.

1. Enter the following primary and column headings on the spreadsheet.

	A	B	C	D	E	F	G	H
1			FBLA	FUND	RAISING	DRIVE		
2	Name	Mon	Tues	Wed	Thurs	Fri	Total	Average
•								
•								
•								

2. Enter the following data on the spreadsheet. Note that headings should already be entered. If you have an FBLA chapter, use actual members and amounts sold.

	A	B	C	D	E	F	G	H
1			FBLA	FUND	RAISING	DRIVE		
2	Name	Mon	Tues	Wed	Thurs	Fri	Total	Average
3	Al	125	134	110	95	65		
4	Belle	112	108	95	100	91		
5	Gordon	88	75	122	80	78		
6	David	107	123	87	76	104		
7	Sue	99	98	143	138	133		

3. Enter a formula to calculate the first student's total sales for the week. The total should appear in Column G.

   Enter a formula to calculate the first student's average daily sales. The weekly average should appear in Column H.

4. Add a row of hyphens separating the column headings from the first student's sales information. Add another row of hyphens following the last line of student sales information.

5. Delete Belle's information; there is no FBLA member with that name.

6. Move David's information so that the information is in alphabetical order according to student names.

7. Fix the column titles in row 2 so that they remain in view when a horizontal window is set and the operator scrolls through a large worksheet.

   Fix the information in Column A so that it remains in view when a vertical window is set and the operator moves from one window to another in the worksheet.

8. Enter the following sales data for week two of the fund-raising campaign.

Al	87	96	107	110	49
David	58	76	84	32	209
Gordon	0	0	0	0	467
Sue	99	10	108	48	139

UNIT TEST

SOFTWARE APPLICATIONS

A. TERMINOLOGY

Directions: Write the definition of each of the terms listed.

A. Data Base

B. Spreadsheet

C. Integrated Program

D. Formula

E. Sort

F. Replicate

G. Data Processing

H. Word Processing

I. Synchronize

J. Window command

K. Field

L. Global command

M. File

N. Update

O. Screen

B. ESSAY

Directions: List and describe three advantages of a comprehensive integrated software package. Use complete sentences in your answer.

UNIT TEST

ANSWER KEY

A. TERMINOLOGY

Directions: Write the definition of each of the terms listed.

A. Data Base--a management information system that contains basic data commonly defined and consistently organized to fit the informational needs of a wide variety of users.

B. Spreadsheet--a software package used by accountants for performing financial calculations and recording transactions.

C. Integrated Program--the combination of application packages into one package that can share data.

D. Formula--a group of symbols (numbers, letters, and signs) that express a single concept.

E. Sort--to arrange records according to a logical system.

F. Replicate--to copy.

G. Data Processing--one or more operations performed on data to achieve a desired objective.

H. Word Processing--using a computer to perform text-editing and formatting.

I. Synchronize--to cause both windows in a spreadsheet to scroll in the same direction at the same time.

J. Window command--a command which splits the screen vertically or horizontally so that the worksheet can be viewed through two segments (windows) simultaneously.

K. Field--a group of related characters treated as a unit.

L. Global command--a command which affects the entire display in a window.

M. File--a collection of related records treated as a unit.

N. Update--to make information more current by adding, deleting, or changing data in a computer file.

O. Screen--a surface on which information is displayed.

B. ESSAY

Directions: List and describe three advantages of a comprehensive integrated software package. Use complete sentences in your answer.

A. An integrated software package is more user friendly. Less coding and fewer steps are needed to move from one major activity or file to another.
B. Integrated software uses a consistent command structure across applications. A code for adding something in a data base could be the same code as that used in adding something in a word processing file.
C. In an integrated package, fewer steps are required and less time is needed to transfer data from one application to another than in separate, compatible packages.

EVALUATION AND TESTING

Ways to Evaluate Pupil Growth

- Class notebook
- Data base reports
- Integrated projects
- Spreadsheet reports
- Unit test

EQUIPMENT AND SUPPLIES

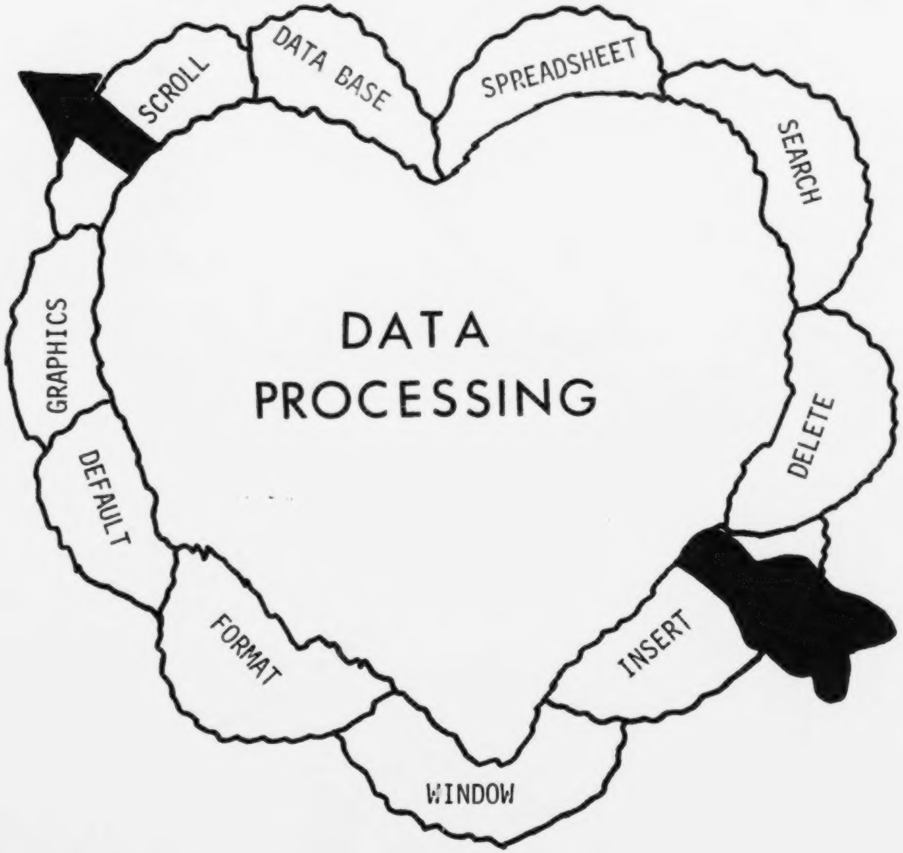
Student

Microcomputer
Data Base Software
Spreadsheet Software
Integrated Software
Training Manuals
Printer
Paper

Teacher

Data Base Software
Spreadsheet Software
Integrated Software
Training Manuals
Index Cards
Overhead Projector
Transparencies

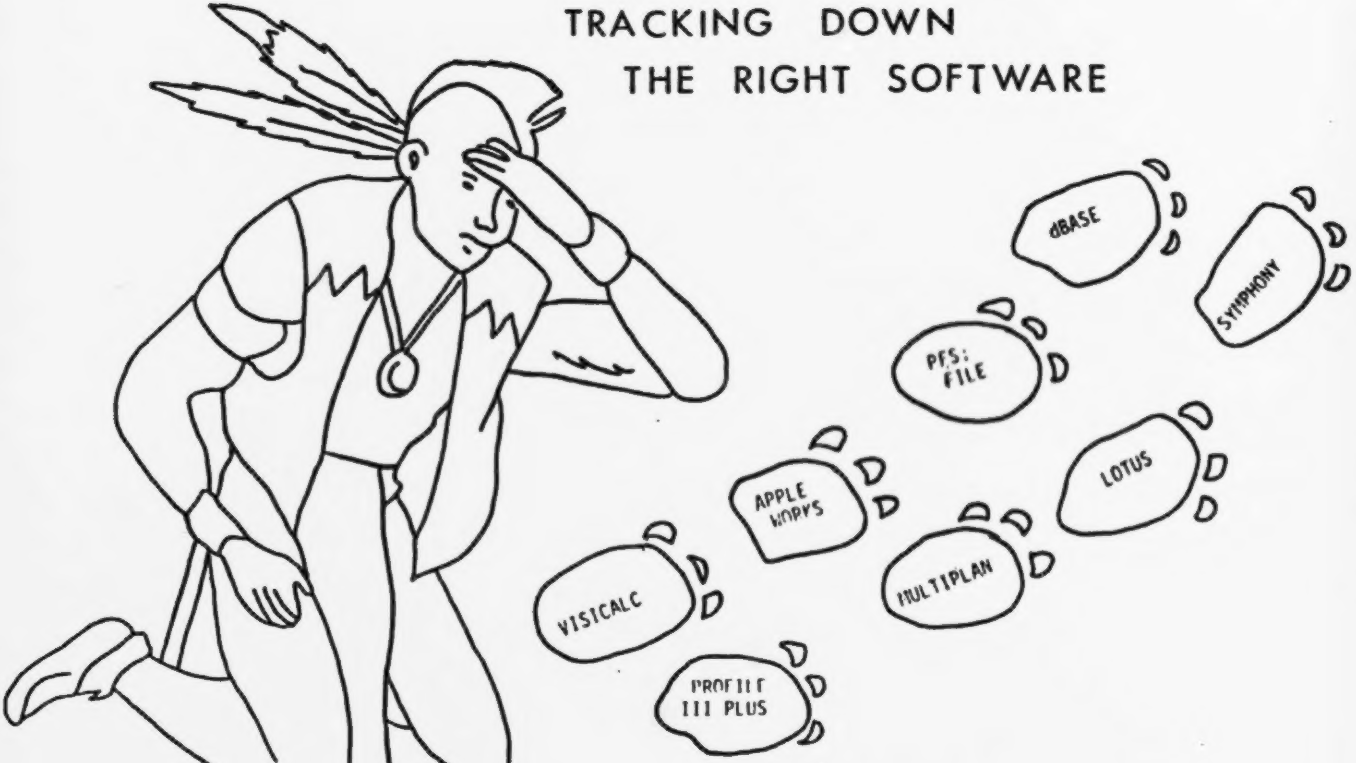
GET TO THE HEART OF THE MATTER



DATA PROCESSING

SCROLL
DATA BASE
SPREADSHEET
SEARCH
DELETE
INSERT
WINDOW
FORMAT
DEFAULT
GRAPHICS

X-24



TRACKING DOWN
THE RIGHT SOFTWARE

dBASE
SYMPHONY
PFS: FILE
APPLE WORKS
LOTUS
MULTIPLAN
VISICALC
PROFILE III PLUS

SUPPLEMENTARY MATERIALS

Software

Appleworks
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014

dBase II and dBase III
Ashton-Tate
10150 W. Jefferson Blvd.
Culver City, CA 90230

Lotus 1-2-3 and Symphony
Lotus Development Corp.
161 First Street
Cambridge, MA 02142

Multiplan
Microsoft Corp.
10700 Northup Way
Bellevue, WA 98004

PFS:File, PFS:Plan, and PFS:Report
Software Publishing Corp.
1901 Landings Drive
Mountain View, CA 94043

Profile III Plus
Radio Shack
A Division of the Tandy Corporation
300 One Tandy Center
Fort Worth, TX 67102

Supercalc, SuperCalc2 and SuperCalc3
Sorcim Corp.
2310 Lundy Avenue
San Jose, CA 95131

Superscripsit
Radio Shack
A Division of the Tandy Corporation
300 One Tandy Center
Fort Worth, TX 67102

VisiCalc and VisiCalc IV
Visicorp
2895 Zanker Road
San Jose, CA 95134

Textbooks

Berst, Jesse. *Computhink Guide to Spreadsheet Software*, 1984, No. 22164.
Bobbs Merrill Educational Publishing
4300 West 62nd Street, P. O. Box 7080
Indianapolis, IN 46206

Knecht, Ken. *The Best Book of: dBASE II/III*, 1985, No. 22349.
Bobbs Merrill Educational Publishing
4300 West 62nd Street, P. O. Box 7080
Indianapolis, IN 46206

Simpson, Alan. *Best Book of: Lotus 1-2-3*, 1984, No. 22307.
Bobbs Merrill Educational Publishing
4300 West 62nd Street, P. O. Box 7080
Indianapolis, IN 46206

Simpson, Alan. *Best Book of: Multiplan*, 1984, No. 22336.
Bobbs Merrill Educational Publishing
4300 West 62nd Street, P. O. Box 7080
Indianapolis, IN 46206

Simpson, Alan. *Best Book of: Symphony*, 1985, No. 22420.
Bobbs Merrill Educational Publishing
4300 West 62nd Street, P. O. Box 7080
Indianapolis, IN 46206

Waite, Burns, and Venit. *SuperCalc Primer*, 1983, No. 22087.
Bobbs Merrill Educational Publishing
4300 West 62nd Street, P. O. Box 7080
Indianapolis, IN 46206

Videotapes

VisiCalc, 1 videotape, 5 student guides
Lansford Publishing Company, Inc.
P. O. Box 8711
San Jose, CA 95155

Lotus 1-2-3, 1 videotape, 5 student guides
Lansford Publishing Company, Inc.
P. O. Box 8711
San Jose, CA 95155

dBASE II, 1 videotape, 5 student guides
Lansford Publishing Company, Inc.
P. O. Box 8711
San Jose, CA 95155

Multi Plan, 1 videotape, 5 student guides
Lansford Publishing Company, Inc.
P. O. Box 8711
San Jose, CA 95155

RESOURCES

Berst, Jesse. The CompuTh!nk Guide to Spreadsheet Software. Indianapolis: Howard W. Sams & Co., Inc., 1983.

Castlewitz, David M. The VisiCalc Program Made Easy. Berkeley, CA: Osborne/McGraw-Hill, 1983.

Clark, James F., and Lambrecht, Judith J. Information Processing. Cincinnati: South-Western Publishing Co., 1985.

Coburn, Edward J. Microcomputers: Hardware, Software, & Programming. Indianapolis: Bobbs-Merrill Educational Publishing, 1984.

Desautels, Edouard J. VisiCalc for the TRS-80 Models III and 4 Computers. 2nd ed. Dubuque, IA: Wm. C. Brown Publishers, 1984.

Everest, G. C. Database Management: Objectives, System Functions, and Administration. New York: McGraw-Hill Book Company, 1984.

Grushcow, Jack. The VisiCalc Applications Book. Reston, VA: Reston Publishing Company, Inc., 1983.

Mandell, Steven L. Computers and Data Processing. 3rd ed. St. Paul, MN: West Publishing Company, 1985.

Parker, Alan J., and John F. Stewart. Apple BASIC for Business, BASIC Programming and VisiCalc. 2nd ed. Reston, VA: Reston Publishing Company, Inc., 1984.

Schnake, Marilyn A. The World of Computers and Data Processing. St. Paul: West Publishing Co., 1985.

Spencer, Donald D. The Illustrated Computer Dictionary. Rev. ed. Columbus, OH: Charles E. Merrill Publishing Co., 1983.

Spencer, Donald D. Principles of Information Processing. Columbus, OH: Charles E. Merrill Publishing Company, 1985.

Stern, Robert A., and Nancy Stern. An Introduction to Computers and Information Processing. New York: John Wiley & Sons, 1985.

UNIT XI

THE IMPACT OF COMPUTERS ON SOCIETY

INTRODUCTION

When the first electronic computers were introduced in the late 1940's and early 1950's, no one could imagine the extent to which they would affect every individual in our society as they do currently. As marvelous as present computerization is, numerous social issues now face our society as it undergoes rapid technological changes.

The purpose of this unit is to familiarize students with the current and potential impact of computers on individuals and on broad areas of our society. Throughout the unit, benefits, potential problems, and dangers of computer use will be presented.

COMPETENCIES

1. Become familiar with issues facing society and the computer industry as the computer era matures.
2. Develop a knowledge of potential future computer applications and technology in many areas of society.

GENERAL PERFORMANCE OBJECTIVES/GOALS

1. Identify concerns expressed about invasion of privacy by the computer.
2. Discuss some of the ethical considerations facing individuals in our computerized society.
3. Recognize components and types of computer system security controls.
4. Develop an understanding of the fifth generation of computers.

SPECIFIC PERFORMANCE OBJECTIVES AND MASTERY CRITERIA

1. On a written test, students will be able to define terms related to the impact of computers on society with at least 75 percent accuracy.

2. On a written test, students will be able to explain with at least 75 percent accuracy how data banks, computer record matching, and electronic funds transfer may pose a threat to an individual's privacy.

3. On a written test, students will be able to identify and define four classifications of computer crimes with at least 75 percent accuracy.

4. Given case situations in class, students will be able to analyze the situations and determine unethical, fraudulent, or criminal uses of the computer with at least 75 percent accuracy.

5. On a written test, students will be able to list with at least 75 percent accuracy three components of computer system security and the precautions that should be taken to protect the entire system.

6. Students will be able to prepare a written report on future computer applications in our society. The report will be evaluated by means of a checklist.

7. Students will be able to research the area of artificial intelligence and write a paper discussing the activities taking place in artificial intelligence. The report will be evaluated by means of a checklist.

METHODOLOGY

The purpose of this unit is to familiarize students with the issues facing society and the computer industry as the computer era matures. Possible applications for future computer systems will also be presented.

Periodicals, guest speakers, and audiovisual aids will be used to enrich the teacher's lectures. Many of these sources are listed in the supplementary materials section of the unit.

SUGGESTED INTEREST APPROACHES

1. Assign the reading of articles on future computer applications and artificial intelligence and have students report orally on the findings.

2. Display a collection of various periodicals representing current literature on computer applications.

3. View audiovisual aids associated with the unit.

4. Invite a lawyer to discuss computer privacy, ethics, and crime.

5. Invite a data processing manager to discuss computer system security.

UNIT OUTLINE

THE IMPACT OF COMPUTERS ON SOCIETY

I. Privacy

  A. Data banks
  B. Federal Privacy Act
  C. Computer record matching
  D. Funds transfer (electronic)

II. Ethics and Crime

  A. Ethics
  B. Types of crimes
    1. theft of data
    2. theft of computer time
    3. property crimes
    4. financial fraud
    5. sabotage
  C. Detection of computer crimes
  D. Laws about computer crimes

III. System Security and Integrity

  A. Hardware security
  B. Operations security
  C. Data security
  D. System access
  E. Materials disposal
  F. Performance of employees

IV. Applications for Tomorrow

  A. Art and entertainment
  B. Education
  C. Homes
  D. Industry
  E. Medicine
  F. Military
  G. Offices
  H. Science
  I. Stores
  J. Transportation

V. Technology for Tomorrow

   A. Hardware
   B. Software
   C. Artificial intelligence

SPECIFIC PERFORMANCE OBJECTIVES AND LEARNING ACTIVITIES

---

1. On a written test, students will be able to define terms related to the impact of computers on society with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Terminology	1. Define words related to the impact of computers on society. (Appendix A) 2. Write definitions in a class notebook. 3. Compete in two teams to define terms presented in the unit.

---

2. On a written test, students will be able to explain with at least 75 percent accuracy how data banks, computer record matching, and electronic funds transfer may pose a threat to an individual's privacy.

Subject Matter Content	Learning Activities
Privacy	1. React to a presentation by a lawyer about the 1974 Federal Privacy Act and our computerized society. 2. In small groups, list possible situations which could pose a threat to individual privacy. 3. Read articles related to data banks, records matching, and electronic funds transfer. 4. Debate the right of the government to retain large data banks and employ record matching techniques.

5. Interview a bank officer to learn about electronic funds transfer and possible loss of individual privacy.

---

3. On a written test, students will be able to identify and define four classifications of computer crimes with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Types of Computer Crimes	1. Collect newspaper and magazine articles related to computer crime.
	2. Discuss collected articles in class and classify the type of computer crime in each article.
	3. Prepare a poster or bulletin board emphasizing the types of computer crimes facing our society.

---

4. Given case situations in class, students will be able to analyze the situations and determine unethical, fraudulent, or criminal uses of the computer with at least 75 percent accuracy.

Subject Matter Content	Learning Activities
Detection of and Laws about Computer Crimes	1. React to a lawyer's presentation concerning existing computer crime laws.
	2. Read articles related to detection of computer crime.
	3. Present article findings to the class.
	4. Evaluate situations to determine unethical, fraudulent, and criminal uses of the computer. (Appendix B)
	5. Submit analyzed situations to the teacher for evaluation.

---

5. On a written test, students will be able to list with at least 75 percent accuracy three of the components of computer system security and precautions that should be taken to protect the entire system.

Subject Matter Content	Learning Activities
System Security and Integrity	1. View audiovisual aids which illustrate procedures taken to provide hardware and operations security.
	2. Discuss data security and means of providing data security.
	3. React to a presentation by a data processing professional related to computer system security.
	4. Scan owner's manuals for various computers to determine recommended data and system security measures.
	5. Interview a data processing professional as to the procedures used at his/her company to limit access to the computer system or to particular data in the system.
	6. List the various media and materials that should be properly disposed of to provide data integrity and security.
	7. Discuss the kind of performance a company would need from its employees to provide computer system security.

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6. Students will be able to prepare a written report on future computer applications in our society. The report will be evaluated by means of a checklist.

Subject Matter Content	Learning Activities
Applications for Tomorrow Art and entertainment Education Homes	1. Read articles relating to possible future computer applications in all areas of society.

Industry
Medicine
Military
Offices
Science
Stores
Transportation

2. Discuss findings with the class.
3. In small groups, brainstorm and prepare a list of possible future uses of the computer in the home.
4. React to the school's Industrial Arts teacher's presentation on CAD/CAM.
5. Interview a science teacher to determine possible future computer applications in science.
6. Select an area of interest and prepare a paper on future computer applications in that field. (Appendix C)
7. Present paper findings orally to the class.

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7. Students will be able to research the area of artificial intelligence and write a paper describing the activities taking place in artificial intelligence. The report will be evaluated by means of a checklist.

Subject Matter Content

Technology for Tomorrow

Learning Activities

1. Read articles describing artificial intelligence and the race to perfect it.
2. Identify a topic of interest in the field of artificial intelligence--game playing programs, thinking computers, expert systems, etc.--and research the topic.
3. Share findings from the above activity in a class discussion.
4. Write a paper describing the major changes in hardware, software, and programming languages which will be necessary to achieve artificial intelligence. (Appendix D)
5. Share findings from previous activity in a class discussion.

APPENDIX A

VOCABULARY

Directions: Define the following terms.

artificial intelligence

CAD/CAM

CAT scanner

Computer assisted instruction

Computer crime

Computer ethics

Computer managed instruction

Copyright law

Cryptography

Data bank

Data integrity

Electronic funds transfer

Electronic mail

Federal Privacy Act of 1974

Hacking

Industrial robot

Integrated workstation

Robotics

Sabotage

Software piracy

Systems security

Very large scale integration

APPENDIX B

COMPUTER ETHICS AND CRIME

Directions: Analyze each situation to determine if the actions are ethical, unethical, or a computer crime.

1. John's parents just purchased a new home computer and various software packages. The retail cost of the software was $795. Sam's home computer is the same model as John's. John makes a copy of each computer disk in the software packages and gives the copies to Sam.

   How would you classify John's actions? Why?
   How would you classify Sam's actions? Why?

2. Sam purchased a new computer game and copied it for John, since John had made copies of software for Sam earlier in the week. The retail cost of the computer software was $49.95.

   How would you classify Sam's actions? Why?
   How would you classify John's actions? Why?

3. Linda is attending the state university, majoring in computer science. She paid a $25 lab fee for her computer course she is taking this summer. Bill is not currently taking any computer courses and does not have a computer password. He has a chance to earn $400 if he can write a particular program and process some data for a friend. He needs to use the school's computer. Linda lets Bill use her password to use the school's computer to get his work done.

   How would you classify Linda's actions? Why?
   How would you classify Bill's actions? Why?

4. Ann works at a very large bank. She has modified an existing program so that when interest on depositors' accounts is calculated, one penny of interest from each person's account goes into an account Ann set up under a friend's name. She believes that no depositor will check the interest earnings closely enough to determine that the amount is one cent off. The account Ann set up keeps growing month after month and even earns interest! After approximately 15 months, the account has a balance of $58,200. Ann's friend closes out the account and they divide the money.

   How would you classify Ann's actions? Why?
   How would you classify the friend's actions? Why?

5. Sunbird Company and Redtop, Inc., are both planning to bid on a billion dollar contract which requires an extensive bid proposal and extensive processing of data. An executive at Redtop pays an employee at Sunbird to "put the computer out of commission" so that Sunbird will not get its data processed and will be unable to submit a bid for the project by the deadline.

   How would you classify the executive's actions? Why?
   How would you classify the actions of the Sunbird employee?
   What recourse does the Sunbird Company have in this situation?

6. Nancy has been asked by her employer to write a program which will process data and calculate incorrect final totals. The employer says he wants the inaccurate totals. The incorrect information will then be used by the employer to interest new investors in the business. Nancy doesn't want to lose her job, so she writes the program.

   How would you classify the employer's actions? Why?
   How would you classify Nancy's actions? Does the fact that she would lose her job if she didn't write the program have any bearing on the case?

7. Al has a home computer and telephone modem. He has gained access to a large company's computer system by breaking through the access codes and passwords. Al creates a fictitious company (ABC Company) and orders merchandise from the large company. He uses the computer to place the orders and arrange for delivery of the shipments. Al's friend Jim receives the goods at a rented building. Al uses his home computer to show that the fictitious company paid for the goods it bought, even though ABC Company sends in no money to the large company.

   How would you classify Al's actions? Why?
   How would you classify Jim's actions? Why?
   What can the large company whose computer was accessed do in this situation?

Note: Answers to situations will depend on the current status of computer crime legislation and crime detection.

APPENDIX C

WRITTEN REPORT EVALUATION--FUTURE APPLICATIONS

STUDENT'S NAME____________________ TOPIC________________________

**10 is the highest possible score in each category.

POINTS EARNED CATEGORIES AND COMMENTS

__________ 1. Neatness--(comments)____________________________________

__________ 2. Subject/Verb Agreement (comments)______________________

__________ 3. Spelling--(comments)____________________________________

__________ 4. Punctuation/Capitalization--(comments)_________________

__________ 5. Introductory Paragraph--(comments)____________________

__________ 6. Body Content or Organization--(comments)______________

__________ 7. Concluding Paragraph--(comments)______________________

__________ 8. Word Usages--(comments)_________________________________

__________ 9. Following Directions--(comments)______________________

__________ 10. Degree of Preparation--(comments)____________________

__________TOTAL POINTS EARNED (possible 100)

__________GRADE EARNED

____
EVALUATOR'S SIGNATURE

*Used with the permission of Kathleen Audiffred of East St. John High.

APPENDIX D

WRITTEN REPORT EVALUATION--ARTIFICIAL INTELLIGENCE

STUDENT'S NAME ____________________ TOPIC ____________________

**10 is the highest possible score in each category.

POINTS EARNED CATEGORIES AND COMMENTS

__________ 1. Neatness--(comments) ____________________

__________ 2. Subject/Verb Agreement (comments) ____________________

__________ 3. Spelling--(comments) ____________________

__________ 4. Punctuation/Capitalization--(comments) ____________________

__________ 5. Introductory Paragraph--(comments) ____________________

__________ 6. Body Content
- a. Major changes in hardware
- b. Major changes in software
- c. Major changes in programming languages

__________ 7. Concluding Paragraph--(comments) ____________________

__________ 8. Word Usages--(comments) ____________________

__________ 9. Following Directions--(comments) ____________________

__________ 10. Degree of Preparation--(comments) ____________________

__________ TOTAL POINTS EARNED __________ GRADE EARNED

UNIT TEST

THE IMPACT OF COMPUTERS ON SOCIETY

A. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents the answer in the space next to each statement.

Column A

_____ 1. Use of a computer to perpetrate acts of deceit or theft that are intended to provide financial, property, or service advantages.

_____ 2. Computer crime which results in destruction of or damage to computer hardware.

_____ 3. Science of coding messages so they are unintelligible to all but the intended receiver.

_____ 4. Standard of moral conduct in computer use.

_____ 5. Breaking computer security measures designed to prevent unauthorized access to a system.

_____ 6. Large collections of information about thousands of individuals, stored on auxiliary storage devices.

_____ 7. Concept of a cashless society.

_____ 8. Science that deals with robots, their construction, capabilities, and applications.

_____ 9. Process in which a student interacts directly with a computer that serves as an instructor to guide the student through the learning material.

Column B

A. Artificial intelligence

B. CAD/CAM

C. CAT scan

D. Computer assisted instruction

E. Computer ethics

F. Computer crime

G. Cryptography

H. Data banks

I. Electronic funds transfer

J. Hacking

K. Integrated workstation

L. Robotics

M. Sabotage

N. System security

O. Very large scale integration

_____10. Method that combines X-ray techniques and a computer for quick and accurate physical diagnosis.

_____11. Field of research currently developing techniques whereby computers can be used to solve problems that appear to require imagination, intuition, or intelligence.

_____12. Technology in which thousands of integrated circuits are stored on a single chip.

_____13. Unit that provides both telephone and computer terminal capabilities within a single unit by allowing voice and data communication.

_____14. General term applied to the efforts being made to automate design and manufacturing operations.

_____15. Protection of data against disclosure and protection of hardware and software against damage or destruction.

B. ESSAY

Directions: Discuss each item, using complete sentences.

1. Identify and define four different classifications of computer crimes.

2. Explain how data banks, computer record matching, and electronic funds transfer may pose a threat to an individual's privacy.

3. List three components of computer system security and two precautions that should be taken for each component.

UNIT TEST

ANSWER KEY

A. MATCHING

Directions: Using the list in Column B, select the term that best completes each statement and write the letter that represents the answer in the space next to each statement.

Column A

F 1. Use of a computer to perpetrate acts of deceit or theft that are intended to provide financial, property, or service advantages.

M 2. Computer crime which results in destruction of or damage to computer hardware.

G 3. Science of coding messages so they are unintelligible to all but the intended receiver.

E 4. Standard of moral conduct in computer use.

J 5. Breaking computer security measures designed to prevent unauthorized access to a system.

H 6. Large collections of information about thousands of individuals, stored on auxiliary storage devices.

I 7. Concept of a cashless society.

L 8. Science that deals with robots, their construction, capabilities, and applications.

D 9. Process in which a student interacts directly with a computer that serves as an instructor to guide the student through the learning material.

Column B

A. Artificial intelligence
B. CAD/CAM
C. CAT scan
D. Computer assisted instruction
E. Computer ethics
F. Computer crime
G. Cryptography
H. Data banks
I. Electronic funds transfer
J. Hacking
K. Integrated workstation
L. Robotics
M. Sabotage
N. System security
O. Very large scale integration

UNIT TEST continued

C 10. Method that combines X-ray techniques and a computer for quick and accurate physical diagnosis.

A 11. Field of research currently developing techniques whereby computers can be used to solve problems that appear to require imagination, intuition, or intelligence.

O 12. Technology in which thousands of integrated circuits are stored on a single chip.

K 13. Unit that provides both telephone and computer terminal capabilities within a single unit by allowing voice and data communication.

B 14. General term applied to the efforts being made to automate design and manufacturing operations.

N 15. Protection of data against disclosure and protection of hardware and software against damage or destruction.

B. ESSAY

Directions: Discuss each item, using complete sentences.

1. Identify and define four different classifications of computer crimes.

   (Students may list any 4 of the following 5 classes of computer crimes.)

   1. theft of data--This includes theft of such things as confidential data, software, mailing lists, medical records, etc.
   2. theft of computer time--This is unauthorized use of another's computer.
   3. property crimes--The computer is used to transfer ownership of property by creating false documents and/or false companies.

4. financial fraud--Funds are transferred into incorrect accounts for unlawful financial gain.
5. sabotage--Sabotage is a crime which results in destruction or damage of computer hardware and/or software. The object of the crime is to make the system inoperable.

2. Explain how data banks, computer record matching, and electronic funds transfer may pose a threat to an individual's privacy.

   Seemingly innocent data is recorded and may possibly be retrieved by unauthorized persons and used for purposes of combining the data with data from other sources to reveal potential incorrect or damaging information about an individual. With EFT, there is also a possibility of surveillance of an individual's activities. List compiling abuses can also result from data banks and record matching.

3. List three components of computer system security and two precautions that should be taken for each component.

   (Students may list any three of the following items.)

   1. Hardware security--Special room locks should be installed, and access to the central computer room should be controlled.
   2. Operation security--Procedures should be developed to protect software from unauthorized modification. File backup procedures must be designed.
   3. Data security--Passwords should be required for access to the system. Access to files should be controlled.
   4. System access--Cryptographic protection should be provided. Sign-on passwords should be changed frequently when dial-up access lines are available.
   5. Materials disposal--Procedures should be developed for disposing of all printouts. Data should be erased from tapes before tapes are discarded.
   6. Performance of employees--The company should desire to employ loyal workers and conscientious, honest employees.

EVALUATION AND TESTING

Ways to Evaluate Pupil Growth

- Class notebook
- Class participation
- Computer ethics situations
- Oral reports
- Poster/bulletin board
- Unit test
- Written reports

EQUIPMENT AND SUPPLIES

Student

Textbook
Notebook
Periodicals
Bulletin Board/Poster Supplies
Newspapers

Teacher

Textbook and Manual
Overhead Projector
Transparencies
Film/Filmstrip Projector
Films and Filmstrips
Bulletin Board Supplies
Newspapers
Periodicals
Report Evaluation Forms
Handouts

WHERE WILL THE FUTURE LEAD

COMPUTER ASSISTED INSTRUCTION

ELECTRONIC MAIL

1985

↓

COMPUTER CRIME

ROBOTICS

1990

↓

EFT

CAT SCAN

2000

PRIVACY

↓

DATA INTEGRITY

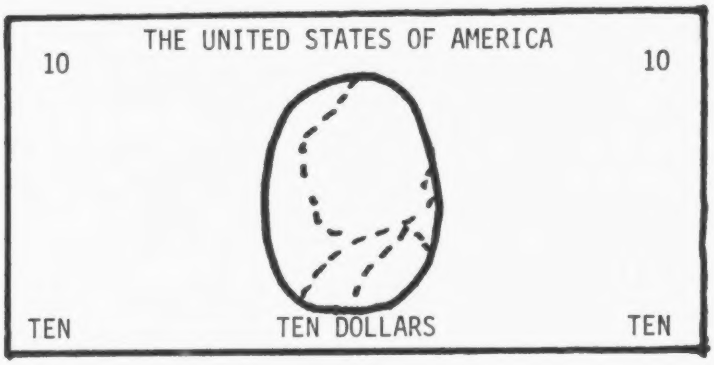
DATA BANKS

ETHICS

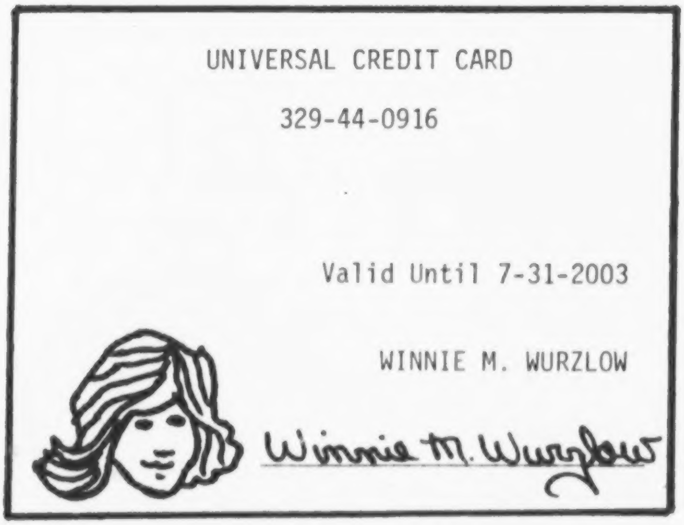
CAD/CAM

ELECTRONIC FUNDS TRANSFER

1985


THE UNITED STATES OF AMERICA
10
10
TEN
TEN DOLLARS
TEN

2000


UNIVERSAL CREDIT CARD
329-44-0916
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Winnie M. Wurzlow

SUPPLEMENTARY MATERIALS

Brochures

What Every Computer User Should Know About Static
ACL, Inc.
1960 East Devon Avenue
Elk Grove Village, IL 60007

Films (16mm)

Importance of Protecting Information
Modern Talking Picture Service
Film Scheduling Center
500 Park Street, North
St. Petersburg, FL 33709

Information . . . Handle with Care
(16130)
Modern Talking Picture Service
Film Scheduling Center
500 Park Street, North
St. Petersburg, FL 33709

The Information Machine
(3352)
Modern Talking Picture Service
Film Scheduling Center
500 Park Street, North
St. Petersburg, FL 33709

Periodicals

BYTE
70 Main Street
Peterborough, NH 03458

Communications of the ACM
Association for Computing Machinery
11 West 42nd Street
New York, NY 10036

Compute!
P. O. Box 5406
Greensboro, NC 27403

Computer Decisions
50 Essex Street
Rochelle Park, NJ 07662

SUPPLEMENTARY MATERIALS continued

Computer Design
II Goldsmith Street
Littleton, MA 01460

Computers and Automation
815 Washington Street
Newtonville, MA 02160

Computerworld
375 Cochituate Road
Framingham, MA 01701

The Computing Teacher
Dept. of Computer and Information Science
University of Oregon
Eugene, OR 97403

Creative Computing
P. O. Box 789-M
Morristown, NJ 07960

Datamation
1801 S. LaCienega Boulevard
Los Angeles, CA 90035

80 Micro
Subscription Department
P. O. Box 981
Farmingdale, NY 11737

Electronic Learning
902 Sylvan Avenue, Box 2001
Englewood Cliffs, NJ 07632

inCider
80 Pine Street
Peterborough, NH 03458

Infosystems
Hitchcock Publishing Company
Hitchcock Building
Wheaton, IL 60187

Interface Age
13913 Artesia Boulevard
Cerritos, CA 90701

Journal of Systems Management
Association for Systems Management
24587 Bagley Road
Cleveland, OH 44138

Mini-Micro Systems
221 Columbus Avenue
Boston, MA 02116

Personal Computer Age
8138 Foothill Boulevard
Sunland, CA 91040

Personal Computing
P. O. Box 2942
Boulder, CO 80322

Popular Computing
70 Main Street
Peterborough, NH 03458

Robotics Age
174 Concord Street
Peterborough, NH 03458

Robotics Today
P. O. Box 930
Dearborn, MI 48121

Software Age
1020 Church Street
Evanston, IL 60201

T.H.E. Journal
Circulation Department
P. O. Box 364
Arlington, MA 02174

Slides/Cassettes

Concepts of Data Processing
MPC Educational Publishers, 1983
3839 White Plains Road
Bronx, NY 10467

Textbooks

Clark, James F., and Judith J. Lambrecht. Information Processing.
South-Western Publishing Company, 1985.
11310 Gemini Lane
Dallas, TX 75229

SUPPLEMENTARY MATERIALS continued

Daggett, Willard R., Kamiran S. Badrkhan, and Benedict Kruse.
Computers and Information Technology.
South-Western Publishing Company, 1985.
11310 Gemini Lane
Dallas, TX 75229

Robichaud, Beryl, Eugene Muscat, and Alix-Marie Hall. Introduction to Data Processing, Third Edition.
Gregg Division, McGraw-Hill Book Company, 1983.
Hightstown/Princeton Road
Hightstown, NJ 08520

Transparencies

Computer Literacy (CL-345T)
National Instructional Systems, Inc., 1983
P. O. Box 1177
Huntington Beach, CA 92647
(714) 968-3700

Introduction to Computers and Data Processing (J526)
South-Western Publishing Company, 1985
11310 Gemini Lane
Dallas, TX 75229

RESOURCES

Data Processing Management Association. *Secondary Curriculum on Information Technology and Computer Information Systems.* 1st ed. Park Ridge, IL: Data Processing Management Association, 1984.

Galenter, Eugene. "Computers will Unravel the Fabric of our Social and Working Lives." *Words*, June-July 1984, pp. 18-21.

Golen, Steven, and Shirley White. "Professional Certification in Data Processing." *On-Line*, Spring 1984, pp. 11-13.

Kroenke, David M. *Business Computer Systems, an Introduction.* 2nd ed. Santa Cruz, CA: Mitchell Publishing, Inc., 1984.

Leeson, Marjorie M. *Computer Information.* Chicago: Science Research Associates, Inc., 1985.

Mandell, Steven L. *Computers and Data Processing Concepts and Applications.* 3rd ed. St. Paul, MN: West Publishing Company, 1985.

O'Leary, T. J., and Brian K. Williams. *Computers and Information Processing.* Menlo Park, CA: The Benjamin/Cummings Publishing Company, Inc., 1985.

Sanders, Donald D. *Computers Today.* 2nd ed. New York: McGraw-Hill Book Company, 1985.

Schnake, Marilyn A. *The World of Computers and Data Processing.* St. Paul, MN: West Publishing Company, 1985.

Shelly, Gary B., and Thomas J. Cashman. *Computer Fundamentals for an Information Age.* Brea, CA: Anaheim Publishing Company, 1984.

Spencer, Donald D. *Data Processing, an Introduction with BASIC.* 2nd ed. Columbus, OH: Charles E. Merrill Publishing Company, 1982.

Spencer, Donald D. *Principles of Information Processing.* Columbus, OH: Charles E. Merrill Publishing Company, 1985.

Trainor, Timothy N. *Computer Literacy Concepts and Applications.* Santa Cruz, CA: Mitchell Publishing, Inc., 1984.